

# FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport.

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## Flight.

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## EDITORIAL COMMENT.



It would seem that the figures recently published in "FLIGHT" setting forth the enemy claims to the destruction of British and Allied aircraft have produced something of a feeling of disquietude in the minds of many who have taken the trouble to dissect the statistics. We do not think there

is any necessity to feel worried about the comparison to be drawn between the numbers of machines the

### The Ups and Downs of War.

Germans claim to have destroyed and those of the enemy which our own official despatches note as having been "strafed" by British or French airmen.

To begin with, we cannot take the German figures as being truthful, either with regard to their own losses or where they relate to claims against the Allies. In a note in a recent issue of "FLIGHT" we showed, for example, that while the Germans admitted a loss of 34 aeroplanes during January on all fronts, the British and French *communiqués* alone recorded that 40 enemy machines were destroyed during that period, without taking any account of 14 others which were reported by Sir Douglas Haig as having been driven down in a more or less damaged condition. The Russian *communiqués*, in addition, reported the destruction of several enemy machines during the month, so if we are to accept our own figures as even approximately correct, we see that

the enemy's aerial casualties are very much heavier than he admits. Why he should take the trouble to issue elaborate statistics of losses which are absolutely false and misleading is one of the things that fail to be understood. It cannot be to deceive the Allied staffs, since the destruction of an aeroplane while flying is not precisely the kind of thing that can escape unnoticed, even when there are other things happening to preoccupy the mind of the observer. Probably the object is to assist in keeping up the failing heart of his own people. Unless it is this, then it seems to us a futile sort of procedure.

Some students of statistics point out that even when we take the figures of our own *communiqués*, certain months show to the advantage of the Germans in the matter of numbers of aeroplanes destroyed in aerial combat or brought down by the anti-aircraft guns. As a matter of fact, it would be surprising if this were not so. We cannot expect always to have things our own way in a war such as this. Of course, we are met at once with the argument that it is claimed that we have now become definitely supreme in the air, and that therefore our losses should be considerably smaller in comparison. That is an entirely fallacious argument. The facts, when they are examined, are all the other way about. One of the first tasks of the British air squadrons at the front is to reconnoitre the enemy's ground and to prevent him from carrying out aerial reconnaissance over our own lines, and that is what they are doing—and doing pretty effectually. To effectively carry out their work, our airmen are constantly flying over the enemy's positions, exposed all the time to the fire of "Archies" and the attack of German battle-planes. We are bound in the nature of things to lose machines at this sort of game, and it further follows that, if we are losing machines over the Hun lines while the enemy is not risking his over our positions, our losses must be the heavier.

There is another aspect of the matter which is often the subject of discussion, and that is the comparative merits—if the term is permissible—of British and German fighting machines, and very often one hears our own types heavily discounted. Again the reply is that we cannot expect to have it our own way *all* the time. We ourselves have not hesitated to speak out when we considered that there was neglect and delay in supplying our gallant pilots with the right machines for their work, but we have never indulged in unreasoned or unreasonable criticism of the authorities who are charged with the supply and administration of the flying services. To expect



them to always have something better than the best the Hun produces is to expect the impossible. It must be kept in mind that the Germans are a clever and inventive engineering nation, with almost limitless resources of production. We can justly claim the same for ourselves. Now, what happens when two nations like Britain and Germany set out on a race to attain the ideal machine? Naturally, there must be fluctuations in which first one and then the other will gain a slight advantage, hold it for a time, and then lose it for another longer or shorter period of time. In point of fact, that is what has been happening through all the 30 months of war. The Germans produce a machine which is a little better than our best, and thus hold a slight advantage of type for a little while. We in the meantime have not been idle, and before long the answer is forthcoming in the shape of something which is a little better than the enemy's best. Then the enemy comes along with yet another improvement, which is almost immediately countered by us—and so the game of see-saw goes on. It is as well to remember that we are dealing with a machine in the aeroplane which is very far removed from finality of type, and one that is subject to—and is actually undergoing—tremendous improvement almost day by day. It is, therefore, inevitable that there should be these ups and downs of which we have spoken, and there is nothing in them to worry us into thinking that we are being left behind in the race for the supremacy of the air. The enemy is suffering from the same disabilities, and just as acutely. We shall not keep ahead of him without strenuous and sustained effort, but we are fully satisfied that that effort is, and will continue to be forthcoming. We know that the ability and the will to keep ahead are there, and we refuse to allow ourselves to be worried into hysterics by any set of statistics the enemy can get together.

• • •

**National Service.** In the first list of trades, issued by Mr. Chamberlain, for which volunteers are specially required no less than 20 occupations are included. Naturally, aeroplane construction occupies a prominent place in the list. We do not doubt, for the reasons we gave in a recent issue of "FLIGHT" when writing on this subject of national service, that there will be plenty of volunteers forthcoming for the particular industry with which we are identified. But while we are not a bit concerned about this one trade, which possesses special attractions of its own, we are not so certain of the success of the whole scheme of voluntary "National Service" for the winning of the war. The question of practically universal industrial service is a much more difficult one than appears on the surface. In the first place, you cannot take 5,000,000 of men away from their ordinary avocations and send them into the fighting services without creating an enormous amount of industrial disorganisation. Add to this that a further 1,000,000, in round figures, have been taken from their ordinary pursuits and put to the making of munitions of war, and it becomes remotely possible to visualise the industrial position. True, we have to some extent eased that position by the employment of women, but that of itself only serves to lessen the gravity of things. It falls very far short of removing it.

This wholesale removal of men from their occupations necessarily means that the reservoir of industrial

man-power has been so seriously depleted that we must be getting somewhere near the bottom and that the end of our reserves is coming into sight. It is just as well to face the facts before we go any further with the discussion. Now, there is no need to become pessimistic in face of these provable propositions, because we know that the enemy is in even worse case than ourselves, but with this difference: that he was wise in time and we were content, under the old Government, to pursue the policy of drift and opportunism. Germany early realised that the time was approaching when she must make her final effort—that everything must be staked on one last desperate throw. Therefore, she decided upon the levy *en masse*, which has resulted in her being able to put into the field armies far larger than have faced the Allies at any period of the war. If we predicate that the German armies are not far short in numbers of a million more men than were in line this time last year, we shall not be far out in our calculation. That being so, it follows that a corresponding effort on our own part is essential if we are to end the war in our favour this year, and that in its turn means that every single person, man or woman, in the country has got to do, not their "bit" only, but their best. The army in the field is all right. It has shown the world again during the past few days of what stern fighting stuff it is composed, but if it is to continue along the golden path of victory it means that we shall have to strain every nerve, every single resource, to keep it supplied with the materials for achieving that ultimate victory upon which we have set our minds.

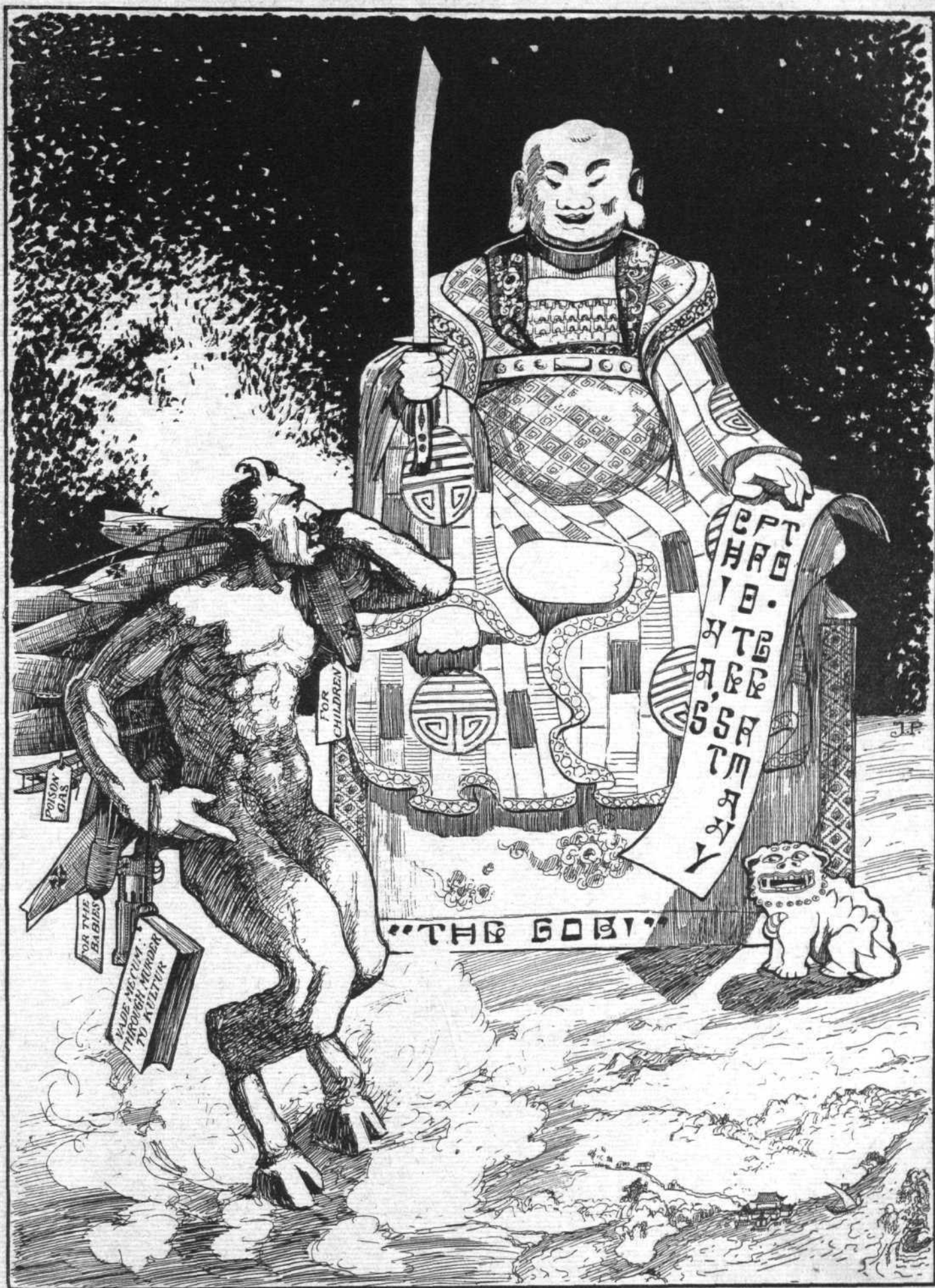
The late Government has left us burdened with the cumulative results of two and a half years of "Wait and See." Its halting policy has left the present administration clogged and trammelled with this pledge and that reservation, given and made in the good—or bad—old opportunist manner. It has left them pledged in this matter of national service that no measures of compulsion shall be adopted until voluntarism has been thoroughly tried out. We are against compulsion on principle, but these are times in which principles have to be discarded without ruth. This question of mobilising the industrial man-power of the nation is a case in point. While we are playing at voluntarism, the German machine of compulsion is effecting its deadly purpose. Surely the time has come when facts have to be looked squarely in the face and some measure—tempered with discretion—of compulsory service adopted. It is only by a single process of mobilisation that we can measure our resources, and it is impossible to achieve that single process by voluntary methods, which result in our getting nothing more than a totally misleading estimate of where we are or what we can do.

• • •

## Feeding the Essential Trades.

It is, to our way of thinking, only under a system of compulsory service that we can make sure of being able to feed our essential trades with the necessary man-power to keep them going at full-pressure. There are very large numbers of people who are now, so to say, serving in the wrong units of the industrial army, and who will under no circumstances, save those of compulsion, leave those units for others. First, we have to deal with the class which does not see why it should sacrifice good money earned in a non-essential occupa-





### The Friendless Outcast of Civilisation.

Another Hun Dream—from the North Sea to the Gobi Desert—dissipated.

"The Chinese Government has handed the German Minister a Note of protest in reply to Germany's announcement of unlimited submarine war, declaring that if Germany disregards this protest, the Chinese Government will be forced to sever diplomatic relations with the German Government."—Official Despatch.



tion for smaller wages in a more necessary one. And, let it be said, it is difficulty to blame the individual for sitting tight when he sees others doing the same. Under the equal treatment of compulsion, that class would automatically disappear, as it did when compulsory military service was instituted. Then, unless we have every man and woman labelled and classified for the work he or she is best fitted to perform, and *available to be sent immediately to that work*, we simply do not know where we are. The voluntary system will never give us that state of things.

There is another class, too, with which we have to deal: that which sees in every expression of confidence in ultimate victory an excuse for hanging back. That class is rather in evidence at the moment. What is the necessity, they ask, for volunteering for work when the war is nearly over? The Germans are on the run already, so what is the use of coming forward now at the tail-end of things? That is the sort of fatuous optimism that does harm. It is very largely the thing that made universal military service necessary. If only they would stop to think! Are the Germans really on the run? We do not mind risking the prophecy that before many days, or at any rate weeks, have passed we shall learn that, so far from being on the run, they are as chock full of fight as ever. Brilliant as the successes of our armies have been in the past few days, they do not warrant the brand of optimism that produces the kind of slacking to which we have referred. Again, there is but one solid cure for the disease—compulsory service.

**Using the Wrong Comb.** The ways of the War Office and the tribunals are past finding out. The latest example of the misuse of the comb comes from Lancaster, where the military representative, acting on instructions from the War Office, asked for the withdrawal of the exemption certificates of 161 men of military age employed by local manufacturing firms. Sir Norval Helme, M.P., spoke for the three firms concerned, and suggested a conference between the military and the employers, so that by a scheme of substitution the firms could keep going. Special cloth ordered by the Aircraft Department (*sic*) was urgently required, but could not be delivered if these men were taken. In the result, the exemptions were continued until the 31st March—and the military representative gave notice of appeal!

Here again is one of these cases in which the military authorities so constantly display a lamentable want of the sense of proportion. Certainly, we want all the men we can get for the army, but the recruiting branch seems to forget that the reservoir is not limitless in its capacity. They seldom or never pause to ask of what use is it to take men into the army at the expense of crippling the very industries that are most essential to supply the needs of the same men when they have been converted into soldiers. Clearly, more common-sense methods are required.

A single moment's reflection upon the aerial events of the moment should mark the aeronautical industry as the one to consider.

## THE ROLL OF HONOUR.

### REPORTED by the Admiralty:—

#### Killed.

F 18244 2nd Grade Air-Mech. J. A. Campbell.  
F 13877 1st Grade Air-Mech. V. J. A. Gill.

#### Died of Wounds.

F 5325 1st Grade Air-Mech. G. L. Cowin.

#### Severely Wounded.

F 6265 1st Grade Air-Mech. E. Anstead.  
F 21600 2nd Grade Air-Mech. A. M. Booker.  
M 16452 1st Grade Air-Mech. R. H. Carney.  
F 14151 1st Grade Air-Mech. A. H. Chelmick.  
F 21602 2nd Grade Air-Mech. J. Edy.  
F 10673 2nd Grade Air-Mech. E. J. Elleman.  
F 6975 1st Grade Air-Mech. R. O. Harding.  
F 13997 2nd Grade Air-Mech. E. D. F. Martin.  
F 13255 1st Grade Air-Mech. G. A. Newman.  
F 11918 2nd Grade Air-Mech. H. Nicholas.  
F 13881 1st Grade Air-Mech. J. W. Parsons.  
F 5494 1st Grade Air-Mech. J. V. Pope.  
F 8119 Leading Mech. F. C. Taylor.  
F 8357 2nd Grade Air-Mech. A. Watson.

### Reported by the War Office:—

#### Killed.

2nd Lieut. W. K. Carse, R.F.C.  
2nd Lieut. A. G. S. De Ross, R.F.C.  
Lieut. J. S. Green, R.F.C.  
Lieut. H. C. Mulock, R.F.C.  
2nd Lieut. F. M. Myers, M.C., Suffolk, att'd. R.F.C.  
2nd Lieut. F. W. Nisbet, Yeo. and R.F.C.  
Capt. F. W. H. Simpson, R.G.A. and R.F.C.  
2nd Lieut. A. E. Townsend, Durham L.I. and R.F.C.  
2nd Lieut. F. C. Young, R.F.C.  
33728 2nd Corpl. Air-Mech. B. Hartley, R.F.C.

#### Previously reported Missing, now reported Killed.

2nd Lieut. G. R. Bolitho, Devon, att'd. R.F.C.  
2nd Lieut. J. N. Holtom, R.F.C.  
2nd Lieut. F. G. Russell, F.R.A., att'd. R.F.C.

#### Previously reported Missing, now reported Missing, believed Killed.

Major M. A. Black, Dragoon Gds. and R.F.C.  
2nd Lieut. H. Matthews, R.F.C.  
Lieut. S. J. M. White, Norfolk and R.F.C.

#### Previously reported Missing, now reported Died of Wounds as Prisoners of War in German hands.

2nd Lieut. J. G. Cameron, Cameron Hdrs., att'd. R.F.C.  
2nd Lieut. F. St. J. F. N. Echlin, R. Fus., att'd. R.F.C.  
1864 Sergt. J. E. Glover, R.F.C.

#### Wounded.

Capt. G. C. Bailey, D.S.O., R.F.C.  
Lieut. S. E. Goodwin, King's (Liverpool) and R.F.C.  
Capt. H. W. G. Jones, Welsh and R.F.C.  
2nd Lieut. W. I. Jourdan, R.F.C.  
2nd Lieut. W. J. Pearson, R.A.M.C., att'd. R.F.C.  
2nd Lieut. H. E. Rathkens, R.F.C.  
2nd Lieut. F. J. Taylor, R.F.C.  
Lieut. R. B. Wainwright, Lancers, att'd. R.F.C.  
290 Flight-Sergt. C. J. Cox, R.F.C.

#### Missing.

2nd Lieut. C. D. Bennett, R.F.C.  
2nd Lieut. H. A. Croft, R.F.C.  
2nd Lieut. E. Hamilton, R.F.C.  
Lieut. C. H. March, R.F.A. and R.F.C.  
2nd Lieut. L. V. Munn, Leicester, att'd. R.F.C.  
Capt. C. L. M. Scott, N. Staffs., att'd. R.F.C.  
Capt. J. M. E. Shepherd, R.F.C.  
2nd Lieut. A. C. Stopher, R. Welsh F., att'd. R.F.C.  
917 Sergt. J. F. Shaw, R.F.C.

#### Previously reported Missing, now reported Prisoners of War in German hands.

2nd Lieut. F. N. Insoll, R.F.C.  
2nd Lieut. A. D. Pocock, R.F.C.

#### Previously reported Missing, now reported Prisoner of War in Bulgarian hands.

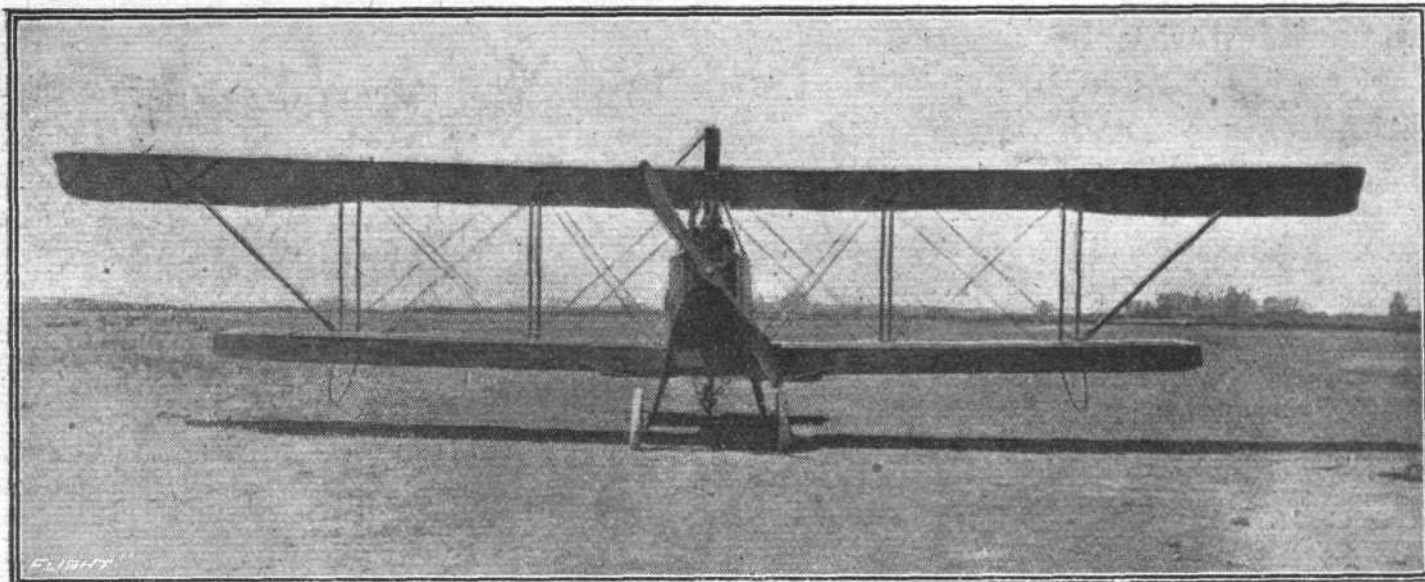
Lieut. S. Smith, R.F.C.



## THE WRIGHT-MARTIN MODEL "R" TRACTOR BIPLANE.

THIS machine has been designed for land reconnaissance work in the absence of enemy aeroplanes and for general sport use. From the Wright-Martin Corporation we learn that it gets off the ground at 47 miles an hour and has a high-speed figure of 86 miles, carrying a useful load of 960 lbs., more

15 ins. apart. Between each main rib are two intermediate false ribs, also of spruce. The main ribs are composed of battens and webs bored with the conventional lightening holes. There are vertical reinforcements to strengthen the ribs in longitudinal shear, and the webs are tongued and dove-tail into

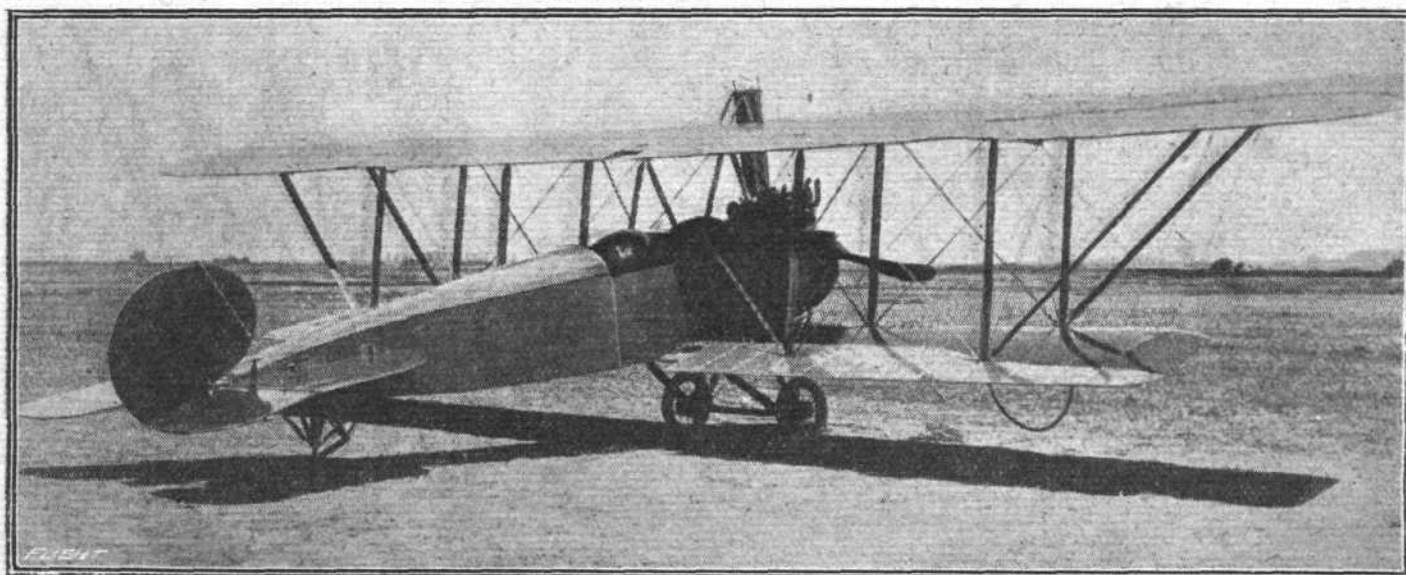


THE WRIGHT-MARTIN MODEL "R" TRACTOR BIPLANE.—The machine viewed from the front.

than half of which may be fuel and oil, sufficient for a non-stop tour of 425 air miles with pilot and observer, and 140 lbs. of luggage. This high speed figure has even been increased to 90 miles an hour in speed tests, and 4,050 ft. have been climbed in 10 minutes.

The upper plane, which is of greater span, is in six sections and the lower in four. The sections are secured in assembly by a substantial steel plate and four-bolt system, this same fitting serving as inter-

the rabbitted section of the front and rear lateral spars. The internal bracing is of the conventional system, heavy plated vanadian steel wire being used, with turn-buckles and wiring plates secured to spars by nickel steel bolts. The wing frames are all built up on jig assembly tables, this insuring absolute interchangeability of respective parts and facilitating manufacture and inspection. The wings are covered with Irish linen answering U.S. Signal Corps specifications for strength and quality. The fabric is sewn



A three-quarter rear view of the Wright-Martin tractor biplane.

plane strut anchorage, through the medium of an original universal strut socket, which permits play both fore and aft laterally. R.A.F. 6-section is employed for both top and bottom planes. The wing spars, stringers, leading and trailing edges are of spruce, as well as the end bows, which latter are laminated. The main ribs are of spruce, spaced

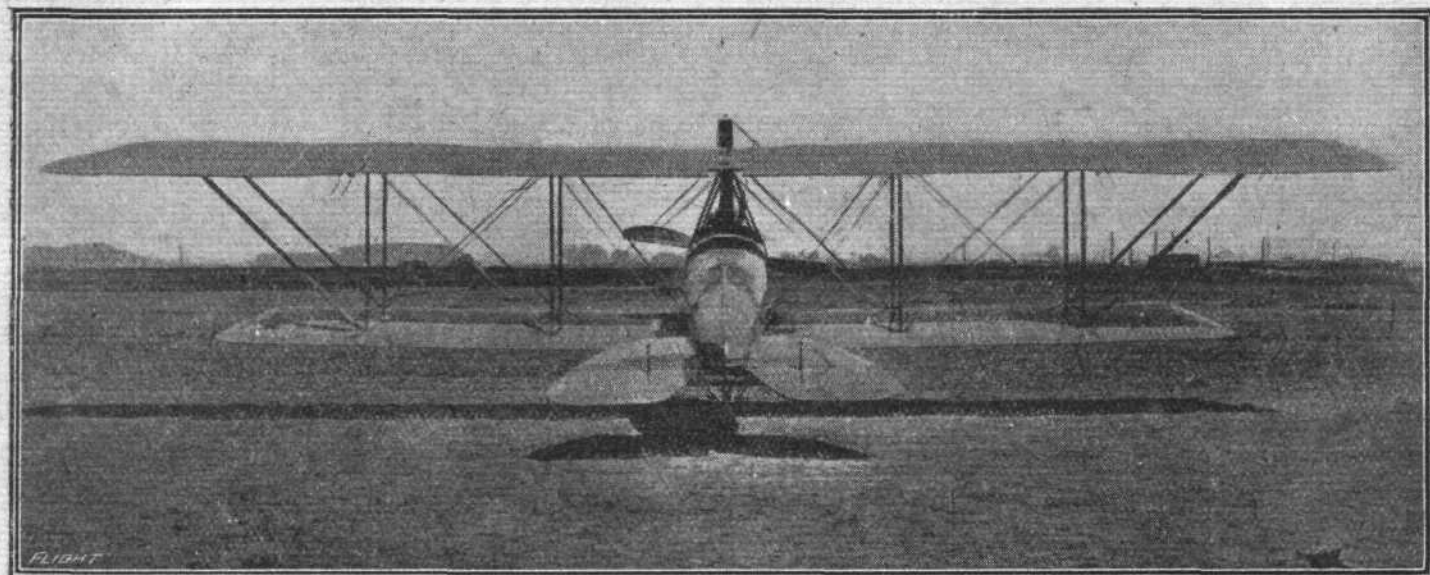
diagonally and placed "on the bias" over the wing frames with linen tape over the ribs. It is given five coats of Wright-Martin doping mixture and two coats of Rexspar varnish, for weather-proofing. A novel feature is found in the metal strip attached to and protecting the leading edge of the wings. This is applied over the fabric to protect the latter



when the machine is dismantled and the wings are set on edge.

The spruce struts are of approved streamline section, hollowed for lightness and offer the greatest

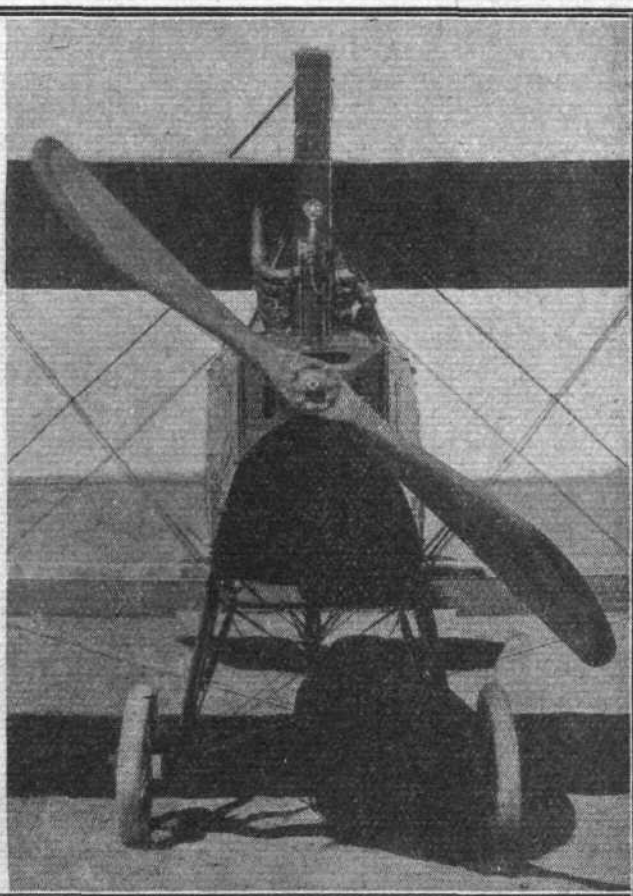
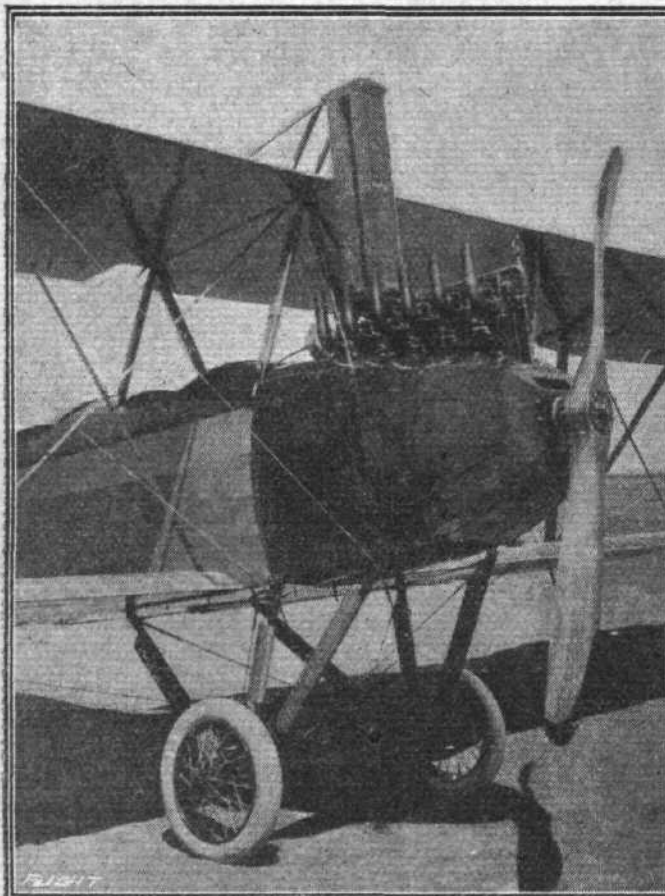
cable with a novel design of wire terminal end and turnbuckle which presents a minimum of head resistance and weight, and is instantly detachable through the removal of the vanadian steel pins.



The Wright-Martin Model "R" tractor biplane seen from the rear.

possible strength-weight ratio. The respective cross sections are the same throughout the strut length, except at the extreme ends, where the strut tapers to its steel base. They are wrapped at the centre with linen tape, and are quick detachable through the use of vanadian steel pins anchoring the sockets

The wing tips are protected by skids placed below the outermost struts. The complete wing truss is well braced against drift by means of four heavy cables running to the nose of the fuselage. All load and supporting cables are doubled. Both wings are given a moderate dihedral angle laterally ( $1^{\circ}$ ), and the



The front portion of the Wright-Martin tractor biplane, showing the 150 h.p. Hall-Scott engine.

to the main plane fittings. The top plane extensions are supported by means of tubular steel diagonal struts which are fitted with wooden streamliners.

External bracing is by Roebing stranded aviation

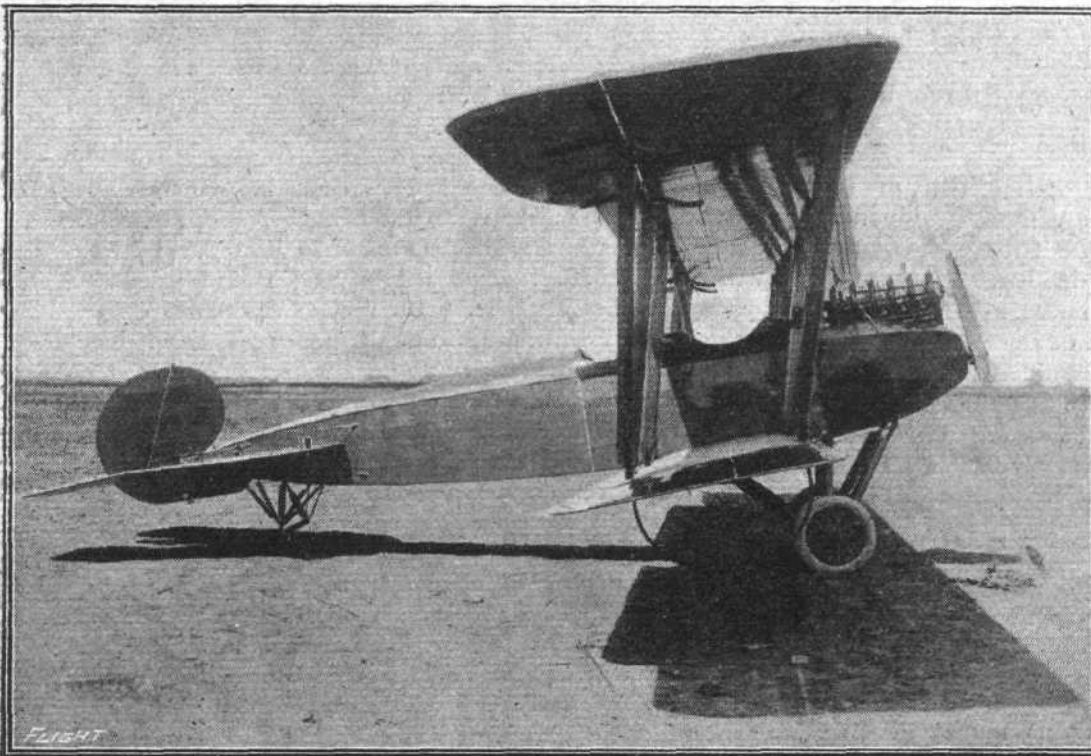
upper wing is staggered approximately 12 ins. forward to increase the observer's range of vision.

There is an adjustable horizontal stabiliser, 26.6 sq. ft. in area, on each side of the rear end of the



*fuselage*, to the rear lateral spar of which are hinged the dual elevators. A small vertical fin, 7.3 sq. ft. area, is mounted under the *fuselage* forward of the vertical rudder. The latter, having an area of 8.7 sq. ft., is hinged to the stern-post of the *fuselage*,

incorporated which eliminates the necessity of vertical control in either upward or downward direction by direct pull wires led through well-anchored brass tubes running laterally in the lower wings.



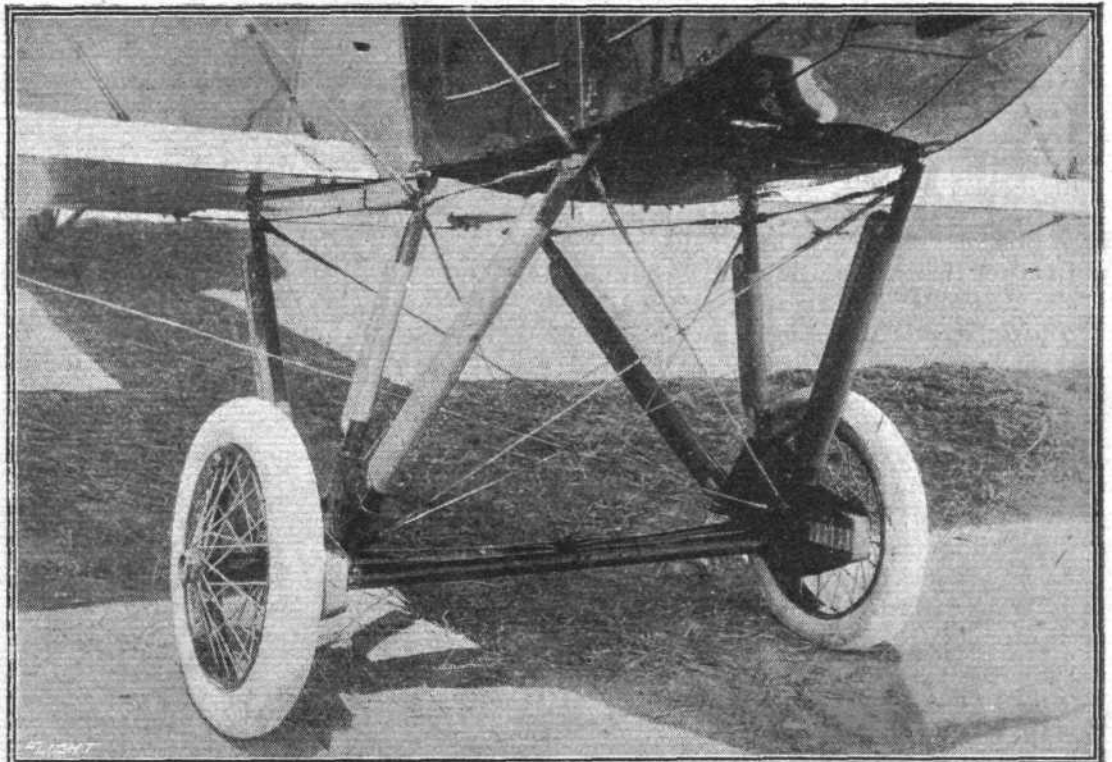
Side view of the Wright-Martin tractor biplane. Note the small vertical fin under the tail.

and both fin and rudder are braced with heavy sectioned wire and turnbuckles.

Elevator and rudder cables are in duplicate, and enclosed in the *fuselage* for the greater part of their length. The *aileron*s, on the upper wings only, are hinged to the outboard sections at the rear wing spar, and are given an increased chord in order to facilitate

The *fuselage* has been designed to provide, with the addition of a small fin, the necessary directional stability with a minimum of side resistance. It is of excellent streamline form and tapers from the well-pointed nose to a horizontal knife edge at the rear. Among its features it incorporates the detachable nose which enables the complete motor unit with

The landing chassis of the Wright-Martin tractor biplane, showing the bridge-type rubber shock absorbers.



their action and render the lateral control extremely powerful and positive. They are built up of spruce framing, adequately braced internally to eliminate distortion, and have an area of 24 sq. ft. each. A novel method of operating the *aileron*s has been

accessories to be quickly removed and another substituted with a minimum loss of time. This is an especially valuable feature from the military standpoint.

It is of the box girder construction, having ash



longitudinal spars throughout, with ash struts and cross members forward and spruce in the rear. It is adequately braced with Roebling vanadian steel wire and turnbuckles. In general design the *fuselage* is of the conventional two-place tandem type accommodating the motor forward in the detachable nose, the observer or passenger in the front and the pilot in the rear cockpit.

Forward the *fuselage* is covered in with aluminium side plates and motor hood, as well as deck cowls to the rear of the pilot's seat. The rest of the *fuselage* is covered with Irish linen of the same specifications as that of the wings, and given the same treatment and finish. The top of the *fuselage* aft of the rear cockpit is made up as a separate crown unit and is readily detachable in order to facilitate inspection and adjustment of the various components.

On either side of the passenger's seat are the petrol tanks. Fuel is supplied the carburettor through the agency of the air pump attached to the motor. The seats in both cockpits are mounted on tubular steel standards so designed that the seat is braced against

tension members. The wheels are of heavy duty type, and fitted with  $26 \times 4\frac{1}{2}$  in. straight clincher double tube tyres. The wheel hubs are bronze bushed and fitted with an effective lubricating system. The chassis is readily demountable through the removal of the nickel steel assembly bolts.

A tail skid of novel design allows a universal movement of this member to facilitate taxi-ing and minimise wear and tear on the *fuselage* itself. The skid is supported by a pyramid of four tubular braces attached to the *fuselage longerons* streamlined with wood fairings. The skid itself is adjustable through a corded rubber shock absorber and aligning cords.

The power plant consists of a six-cylinder 150 h.p. Hall-Scott motor, mounted direct on the shaft of which is an 8 ft. 6 in. tractor screw, having a pitch of 5 ft. 8 in., and an efficiency of 78 to 80 per cent.

The motor is mounted in the detachable nose on pressed steel front and rear plates which support the deep sectioned motor bed. The nose section is well braced with double wire and turnbuckles in the same manner as the *fuselage*. Birch is used in the



[The Wright-Martin tractor lands after a successful flight.

both lateral and longitudinal stresses. The dual control is mounted upon a series of triangulated standards, which give adequate rigidity and strength. In order that lost motion will not be experienced in the elevator control, a separate rock shaft coupled with the control standard has been mounted behind the pilot's seat which connects direct with the control arms on the twin elevators and thus eliminates the crossing of control wires. The cockpits are upholstered.

The instrument board is fitted with the usual flight instruments, and the throttle control is mounted on the *longeron* close to the instrument board. J. M. fire extinguishers are mounted on the *fuselage* strut directly beneath the dash of the rear cockpit, and is accessible from either cockpit. A motometer, mounted in an accessible place above the engine in the water-cooling system, is readable from both cockpits.

The chassis is of Q.D. tubular steel construction, employing three pairs of struts. The suspension is by means of multiple rubber absorbers coacting with a steel bridge. The axle, of nickel steel tubing, is of the hinged type supported in the centre by  $1\frac{1}{2}$ -in. tubular steel compression struts, and two adjustable load cables running upwardly to the *fuselage*. The chassis itself is adequately braced against lateral and longitudinal drift by means of a series of heavy cable

construction of the tractor screw, which is built up of inch laminations, with the tips sheathed in copper.

The radiator is of a new type located above the motor and securely braced by stream-lined steel tubes to the upper wings. This new disposition does not appreciably interfere with the vision of either pilot or observer. The control system is optional. It may be either a three-in-one or the standard "Dep." The three-in-one is composed of a vertical column with the wheel for the rudder, lateral movement of the column for the *ailerons* and rocking fore-and-aft for the elevators.

The following are the general specifications of this machine:—Overall length, 26 ft.  $8\frac{1}{2}$  ins.; overall height, 11 ft. 4 ins.; span (upper), 50 ft.  $8\frac{1}{2}$  ins., (lower), 36 ft.  $10\frac{3}{4}$  ins.; chord, 5 ft. 6 ins.; gap, 6 ft.; area, upper 232 sq. ft., lower 178 sq. ft.; total supporting surface, 458 sq. ft. Loading per sq. ft., 6.25 lbs.; loading per b.h.p., 19 lbs.; speed range, 47-86 m.p.h.; climb, 3,500 ft. in 10 mins.; gliding angle, 1 in 8; capacity of petrol tanks, 70 galls.; oil tank, 9.5 galls.; petrol and oil consumption per hour, 14.2 galls. and 12.5 lbs. respectively. Weight, empty, without power plant, 1,107 lbs.; power plant, 798 lbs.; fuel, &c., for 4 hrs. flight, 480 lbs.; useful load, 503 lbs.; total gross weight, 2,880 lbs.



# The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

## ANNUAL GENERAL MEETING.

THE Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Tuesday, March 20th, 1917, at 3, Clifford Street, New Bond Street, London, W., at 6 o'clock.

### Committee.

In accordance with the rules, the Committee shall consist of 18 members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the Committee are:—

Griffith Brewer.  
Ernest C. Bucknall.  
Flight-Commander John D. Dunville, R.N.  
Col. Sir Capel Holden, K.C.B., F.R.S.  
Prof. A. K. Huntington.  
Squadron-Commander F. K. McClean, R.N.  
Wing-Commander Alec Ogilvie, R.N.  
Lieut.-Col. Mervyn O'Gorman, C.B.  
Flight-Commander C. F. Pollock, R.N.

Any two Members of the Club can nominate a Member to serve on the Committee, provided the consent of the Member has been previously obtained. The name of the Member thus nominated, with the names of his proposer and seconder, must be sent in writing to the Secretary not less than 14 days before the Annual General Meeting. The last day for the receipt of nominations is Tuesday, March 6th, 1917.

## THE FLYING SERVICES FUND administered by

### THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W.

### Subscriptions.

	£	s.	d.
Total subscriptions received to Feb. 20th, 1917	11,178	6	3
Staff and Workers of Gwynnes, Ltd. (Thirty-third contribution)	..	..	9 3 0
From the Officers of the Royal Naval Air Station, Calshot	..	..	6 15 0
C. F. H.	..	..	3 3 0

Total, February 27th, 1917.. .. 11,197 7 3

B. STEVENSON, Assistant Secretary.

3, Clifford Street, New Bond Street, W.

## Fatal Accidents.

AN inquest was held at the Central Flying School, Upavon, on February 22nd, on Sec. Lieut. J. Grieves. It was stated that he was practising landing, and was in the air in a fourth flight when a part of one of the landing wheels of his machine was seen to fly off. Instead of falling clear, it got caught in the blades of the propeller, the engine being running, and the propeller was smashed to pieces. One fragment severed the tail boom of the aeroplane, and the machine, which was then nearly a thousand feet up, fell to earth in a spinning nose-dive, the pilot being killed at once. A verdict of "Accidental Death" was returned. Immediately following an inquest was held on Sec. Lieut. J. L. Fry. He was making a straight glide to land with the engine shut off, when, seeing that he would overshoot the landing ground, he turned sharply to the left. He continued to descend, and at 150 ft. to 200 ft. off the ground made another sharp left turn. This brought him into or across the wind in such a way that the machine nose-dived, and, at that height, there being no time for recovery, it crashed into the ground. A verdict of "Accidental Death" was returned.

An inquest was held at Cirencester on February 24th on Sec. Lieut. H. C. Fry, W. Kent Regt., attd. R.F.C., who died in the Cirencester Hospital on the previous day. Lieut. Fry on February 21st last accompanied as observer Lieut. Finney, the pilot. When six miles from Cirencester, owing to the fog, they determined to land in order to ascertain their whereabouts, and a field was selected for the purpose. As the machine was descending it suddenly nose-dived and fell to the earth. Both officers were badly injured, Lieut. Fry being conveyed to Cirencester Hospital, where he died from injuries to the head. Lieut. Finney was taken to Malmesbury Hospital, where he is suffering from a fractured thigh. The jury returned a verdict that "Death was due to an Accident caused by too sharp a turn, and that there was no defect in the engine."

A South Coast coroner held an inquest on February 27th concerning the death of Lieut. A. S. A. Frederick Sheppard, Royal Flying Corps, who was fatally injured in descending after a flight. The evidence showed that the machine came to earth too quickly, and, instead of landing on the wheels, pitched on the front forks and turned over. A verdict of "Accidental Death" was returned.

## Farnborough Tribunal and R.A.F. Employees.

At the sitting of the Farnborough tribunal on February 21st, after the members had sat for an hour in private, the Chairman, addressing the applicants, some 20 in number, said they had decided not to hear any appeals that day, but

they would sit on March 7th, and hoped to receive in the meantime information respecting employees at the Royal Aircraft Factory.

## A Famous French Pilot Killed.

QUARTERMASTER HAUSS, who recently performed the rare exploit of bringing down four enemy machines in six days, has just paid for his magnificent valour with his life, says the *Matin*. In an air fight in which this intrepid aviator was engaged on February 18th his machine suddenly collapsed in flames, and was dashed to earth. Hauss was 26 years of age.

## Heavy Attacks on Zeebrugge.

A GREAT air raid was carried out against Zeebrugge on the morning of February 16th, says the *Daily Telegraph* Rotterdam correspondent. A squadron of the Allies' aviators made an attack, which lasted more than half an hour, on the harbour and military works in the district. A large number of heavy bombs were dropped, the repeated reports subsequent to the explosions reaching the Belgo-Dutch frontier. A message from Oostburg states that the airmen were very heavily fired upon by German batteries around the harbour and along the coast.

Aeroplanes and seaplanes co-operated in another heavy bombardment on February 27th. More than 50 heavy bombs were dropped on the harbour and neighbouring munitions depots, the explosions resulting therefrom being heard in Holland, and the lights from the large fires which were caused were also seen from there. The garrison of Zeebrugge replied very feebly. The Allied aeroplanes disappeared in the direction of the sea.

## The Raids on Bruges.

FROM Bruges the *Ech Belge* last week learnt that in the course of the first of the three recent raids made by Allied airmen on Bruges the railway line outside the town was destroyed and a vessel at St. Michel, occupied by Germans, was damaged. In the course of the second attack, which was made upon the port this week, serious damage was done to three torpedo boats and the steamer "Colchester." In the third raid a wharf for submarines between Lisseweghe and Zeebrugge was hit.

According to another report, in the raid on Bruges on February 16th 70 men were killed or injured, including many German soldiers and workmen engaged in the manufacture of rifle butts at St. Cruis, near Bruges. Heavy cannonading was audible at Flushing all day, together with loud explosions, supposed to be those of aeroplane bombs.



# AIRISMS

## FROM THE FOUR WINDS.

It was Lloyd George who was really supposed to attend the Allied Mission to Petrograd recently, but he was too scared to venture by reason of the new German submarine frightfulness. So now we know all about it, and as the news comes via the *Cologne Gazette*, why it must be true. The same paper is evidently very concerned under the circumstances, and has gone out of its way to suggest other possible routes by which our Prime Minister could travel, without coming in contact with the U rulers of the sea. One of these routes is via Paris, Rome, Brindisi, Athens, Salonica, Monastir, Jassy (the last stage by aeroplane). Another suggested itinerary is Paris, Madrid, Gibraltar, Tangiers, Algiers, Cairo, Aden, Basra, Teheran, Tiflis and Moscow, the idea being, so as to avoid the attentions of the U-boats, that both the Channel and the Straits of Gibraltar should be negotiated in an aeroplane.

It is truly a marvel that this sort of twaddle is seriously served up to the German people with the object of impressing upon them the stupendous powers of the U-boat form of warfare. If these "explanations" are really accepted, an excuse for such docility and brain weakness may possibly be found in the change which it is said has recently come over the lives of the inhabitants of Berlin. According to the *Frankfurter Zeitung*, Berlin people have become quiet and introspective, and hostesses are acquiring the habit of reciting poetry to their guests. Had the German public only earlier realised that "frightfulness" might ultimately come home to roost in this manner, they might perhaps have exhibited less exultation in the past at the strafing of their much-loved British cousins in dear old England.

SERGEANTS and men of the R.F.C. as Press Photographers in the streets of London upon the occasion of ordinary non-military official functions and otherwise, sounds a bit quaint in these times of "every man wanted for war work"!

WONDER what the official explanation will be of this new "stunt"?

AND how many of the photographs so secured under official protection, were, when offered to the Press for sale, used?

WHY were the regular professional manipulators of the lens officially refused permits to photograph and hustled out of snapping distance by the police, whilst step-ladders with R.F.C. men to look after them and an R.F.C. lorry with its "appendages," in the form of two R.F.C. "snappers" and a stand camera outfit, were permitted to "obstruct" the roadway and route of His Majesty the King?

Looks as if the R.F.C. has men to spare for more important war-work elsewhere.

INCLUDED in the list of names brought to the notice of the Secretary of State for War for valuable services rendered in connection with the war, will be noticed that of Capt. Mansfield Smith Cumming, R.N., who, it may be recalled, qualified for his pilot's certificate on a M. Farman at Etampes on November 10th, 1913, when he was 54 years of age.

As Chairman of the Parliamentary Air Committee, Col. Sir Arthur Lee has done useful work for the cause of aviation in the Mother of Parliaments, but in his new position as Director of Food Production he will probably have little spare time to give to the air question.

Is the aeroplane to be wedded to glue, rag, sticks and dope for ever and for aye? Is it not time that designers and constructors gave their attention to utilising better methods and materials with a view to making the flying machine a sound engineering job.

For the moment the "execution" of the Constitutional Club has been postponed, and the Air Board is to find the extra accommodation claimed for it, elsewhere. Had it been otherwise, there are those about who go so far as to suggest that the whole squeezing-out process of the C.C. is an obvious political job legacy, its political rival's ejection

and re-housing having been first most carefully planned and provided for, opposite the Houses of Parliament.

WHAT a rôle of crime political jobbery has to answer for!

THE old proverb of a sprat to catch a whale will have to have a new rendering now: "A seaplane to catch a liner," or what-not. All the same, the story sounds a bit far-fetched of the *Telegraaf* in which it is related that the crew of the steam trawler "Groningen" reported that, while fishing between the Schouwen Bank and the Maas lightship, they saw a seaplane floating on the water with an airman in it. They lowered a boat and rowed to the seaplane, but on reaching it they found it to be a sham German seaplane and a dummy airman. A German submarine was lurking in the neighbourhood. On the boat's crew reaching their vessel again, the submarine began firing at the seaplane and sank it after the fifth shot.

RATHER a curious idea of the Huns to include in an exhibition of "German Air War Booty" in Berlin, the wreath of violets which was dropped by the R.F.C. into the German lines in Böelcke's memory after the news of his death was confirmed. There must be one German at least with still a touch of sentiment left in him for such a tribute to be staged in the special section even of the exhibition devoted to the late Fokker champion.

FOLLOWING the recent important sale at Christie's of the glorious gems of the late Sir George White, a number of Sir George's pictures were last week also dispersed by the same auctioneers, these realising £7,223 12s. 6d.

THAT "Unseen Hand" must have been at work to worry poor Skipper Martin, of the Grimsby trawler "King Stephen," who left the wrecked "Z. 19" to its fate in the North Sea, into his grave at the early age of 45. The action of Martin rightly brought home to the Huns in a material form the value which is now attached to the honour of a German even when he is an officer in the Navy. It is a pity the writers of the anonymous letters which so distressed the unfortunate skipper and brought him to an early grave could not have been traced. There might be a chance then of "interning" these unclean fighters in our midst, and in about the same cubic capacity of space as the remains of Martin by now occupy. More power therefore to the work of those who are working so strenuously to expose and destroy the "Unseen Hand." It is not necessarily a German hand. There are others.

A SOLILOQUY with a not unsound moral from the *Daily News*: "It is lamentable that the arming of merchantmen was so seriously interfered with last year by the clamour which diverted all the surplus energies of the arsenals to the provision of anti-Zeppelin guns, and made the protection of the merchantmen wholly subsidiary to the protection of English towns. Had those energies been fairly divided between the two tasks many thousands of tons of shipping now at the bottom of the sea would still be afloat. For a year ago the comparison of the immunity of the armed vessel with that of the unarmed was as ten to one."

APROPPOS the great speech of the Premier last week, which has had such a rousing effect throughout the world, including official Germany, the American papers are particularly complimentary. Thus the *New York Times* upon the tonnage problem proposals: "British ruthlessness is of a different kind from the German; it slaughters no innocents and breaks no commandments, but in its own fashion it is just as vigorously applied, not to neutrals but to the men and women of Great Britain. It is almost amusing to look back and reflect that this is the nation which Germany imagined she could scare into begging for peace by a few Zeppelin raids and by bombarding fishing villages and summer resorts."

To protect the Parthenon Frieze and Metopes and the Assyrian bas-relief at the British museum against hostile aircraft, it cost the country a little over £3,000. That is



one of the items which emerge from the appropriation accounts of the Civil Service and Revenue Departments which fill a bulky volume of 451 pages!

ANOTHER notable Frenchman has passed away under duty for his country. Edouard Lumière, who as a Sergeant-aviator in the French Flying Service has just been killed in an aeroplane accident, was one of the brothers who it is claimed invented the cinematograph.

AN echo of the death of Pégoud is to hand from Paris in the report of the sale at St. Cloud of two of this great pilot's aeroplanes. They each fetched £1,200, one going to a Frenchman and the other to an English buyer. These are the two machines on which Pégoud had arranged to give looping exhibitions in America, and for this purpose they had actually been embarked—on a German ship—when war was declared.

FROM R. L. Desoutter, the well-known test pilot and the brother of Marcel, we have received the following interesting communication:—"The letter from a young Flying Corps officer describing a 'Mirage' collision in the air which you publish in this week's 'FLIGHT' greatly interests me, as I had a similar experience occur to me while testing one of the twin-engined Caudrons at Hendon last year. I can well imagine the feelings of the officer in question, having experienced them myself, but in my case they did not last long, as I knew that the machine I was flying was the only one of its kind in the neighbourhood at the time, and therefore at once came to the conclusion that it could only be a reflection in the clouds, of my own machine."

#### TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's precursor and sister Journal) of March, 1907. "FLIGHT" was founded in 1908.

#### A SQUADRON OF AIRSHIPS FOR FRANCE.

The predecessor of "La Patrie," now generally known as the "Lebaudy," seems to have permanently taken up her residence at Chalais Meudon, where she forms a sort of instruction airship, in which the staff of aeronautical soldiers whom France is training receive instruction in the management, manipulation, and the ways of airships generally. So satisfied have

the authorities been with the behaviour of "La Patrie" that orders have been placed with Messrs. Lebaudy for three new airships, which are to be practically sister ships to "La Patrie," the first two of which will bear the names of "La République" and "La Démocratie" respectively.

#### THE DELAGRANGE AEROPLANE.

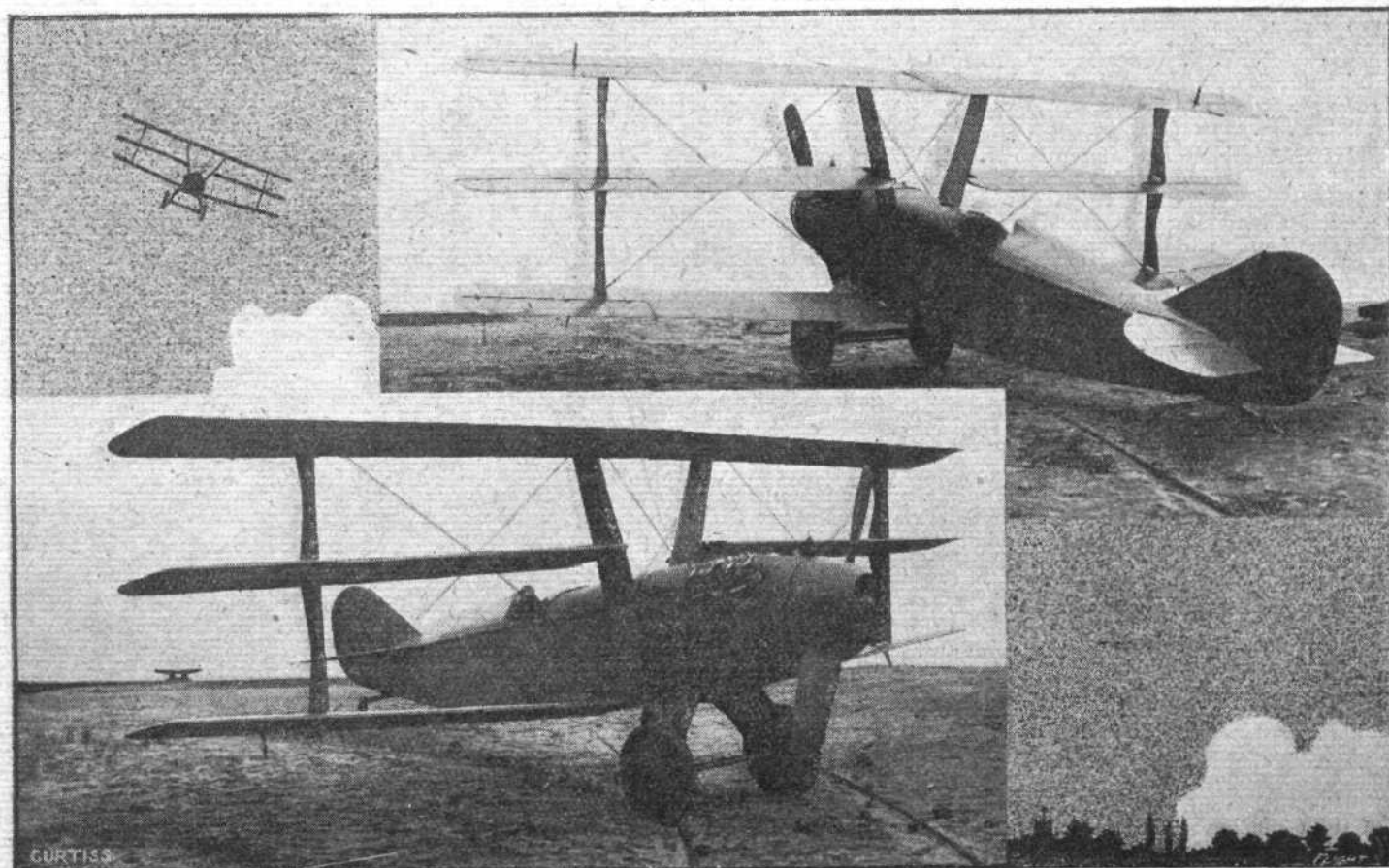
A new aeroplane, designed by M. Delagrangé, will shortly be ready for experiment at Bagatelle. The machine, which is to be fitted, we understand, with a 50 h.p. Antoinette motor provided with a propeller 2½ metres in diameter, consists of two superposed aeroplanes, the whole being of cellular construction, presumably something like M. Santos Dumont's, and weighing all complete 290 kilograms.

#### THE ELLEHAMMER FLYING MACHINE.

Upwards of a year ago we described the first experiments of Herr Ellehammer in Denmark, who was then credited with having attained a flight of 50 metres through the air, rising from the ground and alighting again without injury. There are two sets of aeroplanes or curves, the lower of these is curved at the centre upwards into a semi-cylindrical portion, at the front of which is situated the propeller, so that the propeller may be said to work in a tunnel, and the air which it shifts backwards passes through a semi-cylindrical tunnel behind it. The propeller-shaft is driven by belting from the motor which is suspended beneath. Over the aeroplanes on either side of the half-cylinder are two arrangements which it is perhaps best to call wings, as it is not until the machine is in motion and passing through the air at some speed that they come into operation. They are large sheets of canvas restrained by cording, which then rise up and stand above the permanently stretched aerocurves below, much like two half umbrellas. The machine runs on two bicycle wheels to get up speed, and the aeronaut sits on a bicycle saddle slung behind the motor, which latter develops a power of 18 h.p. The machine altogether weighs about some 243 kilogs., with the water and fuel, but without the aeronaut.

#### A CHEAP WAY OF RAISING THE WIND.

The German Government, it is announced, has authorised the organisation of a lottery on behalf of Count Zeppelin, the proceeds of which, over and above, of course, what will be given in prizes, are to be devoted to experiments in the conquest of the air.



TWO VIEWS OF THE LATEST CURTISS TRIPLANE SCOUT.—Several modifications on the model illustrated in our issue for January 25th last will be noticed. It is of smaller span, and all three planes are equal. The body is of better streamline form, and the chassis struts are arched.



## "MENTIONED IN DESPATCHES."

It was announced on February 24th that the names of the following had been brought to the notice of the Secretary of State for War for valuable services rendered in connection with the war:—

Capt. and Bt.-Major (temp. Lt.-Col.) R. K. BAGNALL-WILD, R.E.  
 Bt.-Major (temp. Lt.-Col.) W. D. BEATTY, R.E. and R.F.C.  
 Major (temp. Lt.-Col.) B. R. W. BEOR, R.A. and R.F.C.  
 Temp. Lt. P. BISHOP, R.F.C.  
 2nd Lt. S. BLACKMAN, R.F.C.  
 Lt. G. P. BULMAN, R.F.C. (S.R.).  
 Capt. (temp. Major) C. D. M. CAMPBELL, R.F.C. (S.R.).  
 Lt. (temp. Major) H. E. CHANEY, Lancs. F. and R.F.C.  
 Temp. Capt. C. E. I. CHARLTON-ANNE, Gen. List and R.F.C.  
 Capt. A. G. CLARK, R.F.C.  
 Capt. (temp. Lt.-Col.) R. H. COLLIER, R.F.C. (S.R.).  
 Lt. (temp. Capt.) F. DUNN, R.F.C. (S.R.).  
 Lt. (temp. Major) H. S. EBBEN, R.F.C. (S.R.).  
 Temp. Capt. W. S. FARREN, R.F.C.  
 Temp. 2nd Lt. V. R. M. GATTIE, employed R.F.C.  
 Temp. Major F. W. GOODDEN, R.F.C. (S.R.).  
 Temp. Capt. F. M. GREEN, R.F.C.  
 Temp. Capt. H. GRINSTED, R.F.C.  
 Temp. Lt. L. H. HALL, R.F.C.  
 Temp. Major S. HECKSTALL-SMITH, R.F.C.  
 Temp. Major G. L. F. HENDERSON, R.F.C. (S.R.).  
 Temp. Capt. S. W. HISCOCKS, R.F.C.  
 Capt. H. E. A. LINDSAY, R.F.C.  
 Temp. Lt.-Col. G. LIVINGSTONE, London R. and R.F.C.  
 Capt. A. M. LOW, R.F.C.  
 Qrmr. and Hon. Lt. (temp. Capt.) J. LYONS, R.F.C.  
 Temp. Capt. R. M. S. MAXWELL, R.F.C.  
 Qrmr. and Hon. Lt. (temp. Capt.) A. G. MURPHY, R.F.C.  
 Lt. P. C. M. O'CAFFREY, R.N.A.S.  
 Qrmr. and Hon. Lt. (temp. Capt.) J. E. PARKIN, R.F.C.  
 Qrmr. and Hon. Lt. (temp. Capt.) S. J. PAYNE, R.F.C.  
 2nd Lt. (temp. Capt.) E. S. PERRIN, R.F.C.  
 Capt. L. SADLER, R.F.C.  
 Major (temp. Lt.-Col.) C. SAUNDERS, Dorset R. and R.F.C.  
 Temp. Lt. F. A. SHORT, R.F.C.  
 Capt. the Hon. E. A. STONOR, R.F.C.  
 Temp. Major G. I. TAYLOR, R.F.C. (S.R.).  
 Lt. (temp. Capt.) C. C. TREATT, N. Lancs. R. and R.F.C.  
 Lt. J. D. TROUP, R.F.C. (S.R.).  
 Temp. Major G. B. TURNER, R.F.C.  
 Major L. W. F. TURNER, R.F.C. (S.R.).  
 Temp. Capt. O. A. WESTENDARP, London R. and R.F.C.  
 Capt. C. W. C. WHEATLEY, R.F.C.  
 Lt. C. H. WHITTINGTON, R.F.C.  
 Qrmr. and Hon. Lt. (temp. Capt.) J. H. WILFORD, R.F.C.  
 8548 1st Air-Mech. C. ADAIR, R.F.C.  
 6499 Flight Sergt. J. O. ANNAN, R.F.C.  
 6080 1st Air-Mech. G. E. BELCHER, R.F.C.  
 1159 Flight Sergt. H. BERE, R.F.C.  
 G/25762 Sergt. J. E. BIRD, R.F.C.  
 40 Flight-Sergt. (actg. S.M.) E. BOLT, R.F.C.  
 1440 Actg. Sergt.-Major F. H. BRYANT, R.F.C.

4410 Flight-Sergt. H. BULL, R.F.C.  
 3706 Flight-Sergt. F. CALMAN, R.F.C.  
 6813 1st Air-Mech. D. CARTER, R.F.C.  
 29574 Corpl. R. C. CHAPLIN, R.F.C.  
 1344 Flight-Sergt. S. W. COCKRAN, R.F.C.  
 2434 Flight-Sergt. S. T. CONDICK, R.F.C.  
 2325 1st Air-Mech. A. T. COOPER, R.F.C.  
 21269 Corpl. W. H. T. CUNNINGTON, R.F.C.  
 6328 1st Air-Mech. H. CUTTS, R.F.C.  
 1020 Flight-Sergt. R. DONALDSON, R.F.C.  
 19460 1st Air-Mech. W. FORANGUE, R.F.C.  
 5296 Sergt. W. A. GLASPER, R.F.C.  
 33 Sergt.-Major F. C. GRIFFIN, R.F.C.  
 4220 Corpl. F. R. GROVES, R.F.C.  
 18664 Corpl. P. C. HAM, R.F.C.  
 1408 Sergt. R. HARDING, R.F.C.  
 4542 Sergt. F. W. HESTER, R.F.C.  
 2956 Flight-Sergt. W. HILL, R.F.C.  
 50826 Sergt. E. HISCOCK, R.F.C.  
 G/21797 Sergt. H. E. HOTCHIN, R.F.C.  
 3752 Actg. Sergt.-Major A. E. HOUGHTON, R.F.C.  
 1734 Flight-Sergt. R. A. HOWES, R.F.C.  
 5178 Sergt. R. C. JACKSON, R.F.C.  
 13137 Flight-Sergt. A. D. JOHNS, R.F.C.  
 1423 Sergt.-Major H. KARSLAKE, R.F.C.  
 6491 Sergt. A. G. KNIGHT, R.F.C.  
 8337 Acting Sergt.-Major H. KNIGHTS, R.F.C.  
 798 Flight-Sergt. (A.S.M.) F. LAMBIN, R.F.C.  
 1850 Flight-Sergt. E. LANCASTER, R.F.C.  
 3965 Actg. Sergt.-Major H. LAWSON, R.F.C.  
 8099 Actg. S.M. H. LEE, R.F.C.  
 Petty Officer R. A. LIVERMORE, R.N.A.S.  
 1289 Actg. Sergt.-Major W. LOUGHHEAD, R.F.C.  
 4637 Sergt. J. MAJOR, R.F.C.  
 17 Flight-Sergt. (actg. S.M.) E. MALLET, R.F.C.  
 3940 Actg. Sergt.-Major J. MATTHEWS, R.F.C.  
 4037 1st Air-Mech. D. L. MONTEITH, R.F.C.  
 15102 Actg. Corpl. A. J. MUNSTON, R.F.C.  
 2622 Sergt. G. E. PARKER, R.F.C.  
 19938 Sergt.-Major J. PELL, R.F.C.  
 5991 1st Air-Mech. J. F. S. PERCIVAL, R.F.C.  
 1216 Actg. Sergt.-Major E. RAMSDEN, R.F.C.  
 22521 Col.-Sergt.-Major L. A. RANSOME, Norfolk and R.F.C.  
 15586 Actg. Sergt.-Major W. L. RENNIE, R.F.C.  
 14207 1st Air-Mech. E. SINGLETON, R.F.C.  
 3081 1st Air-Mech. T. W. SMITH, R.F.C.  
 1487 Actg. Sergt.-Major W. E. SMITH, R.F.C.  
 960 Flight-Sergt. J. M. G. STRONACH, R.F.C.  
 19987 Actg. Sergt.-Maj. A. W. TURNER, R.F.C.  
 2867 Flight-Sergt. E. W. UTTERIDGE, R.F.C.  
 6186 Flight-Sergt. R. VICCARS, R.F.C.  
 2976 Flight-Sergt. A. G. H. VINT, R.F.C.  
 S.R. 18 Flight-Sergt. H. WARBOYS, R.F.C.  
 963 Sergt. R. WILDBORE, R.F.C.  
 591 Sergt. W. J. L. WILLIAMS, R.F.C.  
 343 Sergt.-Major F. E. WINTER, R.F.C.  
 10342 Corpl. C. J. WOODCOCK, R.F.C.

### French Air Officers See the King.

THE *Court Circular* of February 27th states that the following officers of the French Air Service Directorate, Col. Regnier, Lieut.-Col. Dorand and Commandant Faure, with Col. the Vicomte de la Panouse (French Military Attaché) and Major the Hon. Edward Stonor (Royal Flying Corps, specially attached)—had the honour of being received by His Majesty at Buckingham Palace.

### Relic of Last September's Zepp. Raid.

AN unexploded bomb was found on Saturday embedded in a garden in a Midland town. It is believed to have been thrown from a Zeppelin during the raid last September.

### An Echo of the "L. 19" Incident.

THE death from heart failure at Grimsby on February 24th of Skipper Martin recalls the wreck of the "L. 19" in the North Sea on February 2nd, 1916, as he was the skipper of the Grimsby trawler "King Stephen" which sighted the wrecked airship. As, however, the crew of the airship numbered 20 and the trawler only carried nine, Martin refused to take the risk of being overpowered. Afterwards Skipper Martin is said to have received anonymous threatening letters from German sympathisers in this country, and the consequent worry appears to have undermined his health.

### Germans Fear Air Raids.

THE German Government, according to the *Basler Nachrichten*, has placed a large number of distinguished English and French officers in the concentration camp in an exposed district of Karlsruhe as a guarantee against further aerial bombardments.

The raids on Munich have occasioned a good deal of anxiety in Bavaria, and the War Minister has stated that the whole defence of Bavaria against air attacks is now as complete as human power can make it, and that the population can therefore be entirely easy.

### Bang Went the Window—Ditto £10.

TAKING a photo. of a searchlight is expensive, as John Turner, said to be the son of a clergyman, found to his cost—£10—when interviewed by the Mortlake Bench. Defendant pleaded that he was taking a picture of the snow on the common and the searchlight came within range of the camera. A sergeant who was on duty at the searchlight station at the time said he saw the defendant on a windowsill of a house pointing towards the station. When the defendant saw him he banged down the window. The Chairman remarked that such offenders were liable to a fine of £100 and six months' imprisonment.



## AVIATION IN PARLIAMENT.

### Sir E. Carson on the Air Lord.

IN his statement introducing the Naval Estimates in the House of Commons on February 21st, Sir E. Carson, the First Lord of the Admiralty, said: "There have been other changes at the Board to which I will make a passing reference. We have appointed a fifth Sea Lord to deal mainly with the Naval Air Service, because, as the House will recollect, an Air Board has been appointed. He represents the Admiralty on the Air Board, and I feel certain, from what I have heard, that the appointment of the Air Board, with the necessary co-ordination between its services and the supply being vested in the Minister of Munitions, will greatly increase the efficiency of the Air Service, and greatly increase, what is above all necessary, the output of our aeroplanes."

### The R.N.A.S. and the Air Board.

IN the debate on the Navy Estimates in the House of Commons on February 26th, Capt. Burgoyne, in moving a reduction of the vote for men by 100, raised the question of the R.N.A.S. in its administration and its connection with the general air policy of this country. He reviewed the delays in connection with the provision of airships, and said it was a misfortune that from 1909 to 1915 there should have been contradiction, reversal and mutation in the orders given. He also pointed out the serious delays which had arisen through overlapping and jealousy between the two air services as regards the supply of engines, nuts, bolts, tubes, wires, &c. In conclusion Capt. Burgoyne said he believed that the First Lord of the Admiralty would find an immense relief when the whole of this service was taken out of his hands and placed in charge of the Air Board. It was not the Admiralty's job. Under the new scheme, as far as he had been able to grasp it, it was proposed to divide the experimental and inventions staff, and for some time at least the Admiralty intended to retain the command of the airships. The analogy of the submarines was advanced as a very good argument, but he saw none whatever. The submarine cannot get out of the water and an airship can go as much over land as over water. He wished to know whether they were prepared to hand over the whole thing lock, stock, and barrel, so that we might see in the inclusion of the Royal Flying Corps and of the Royal Naval Air Service the genesis of a central Air Service. These services had now become so large that they ought to be treated as a new and altogether independent service. They wanted it to be taken out of the hands of those officers, from whom they could not expect the same enthusiasm in the new developments of these services as from the younger men, who have a full appreciation of what it means to the country. They were likely to see the expenditure after the War as large upon air services as was spent in pre-war times upon our Navy and upon our Army. Obviously they must come to the time when the Air Service will stand by itself. The Board of Admiralty had got ample to do in carrying on the sea work of the War. Let them look after their job, and let the Army look after its job, and let the Air Board tackle the Air Service. He did not suggest that the Air Board should dictate in matters of strategy and tactics as to what the naval share of the Air Service was to do or as to what the Army share of the Air Service was to do. Those were matters for the experts in the particular line. But at least let them concentrate in the control, the administration, the early days of education, and the ordering in one department. He felt sure that if they did they should get more inter-relation and effort, and a big advance on what had taken place in the past.

The Chairman: I understand that there is to be a separate Vote in the Estimates for next year for the Air Board which was set up by legislation at the end of last year. Therefore that is the occasion for any general discussion of the administrative work of the Air Board.

The Parliamentary Secretary to the Admiralty (Dr. Macnamara): As regards the Air Board, the constitution of that Board was set forth by an Order in Council of February 6th. I was very glad to hear his reference to the Fifth Sea Lord and the confidence which he rightly felt in him. To the Fifth Sea Lord is assigned the general responsibility for the administration of business relating to the Air Service, and he represents the Board of Admiralty upon the Air Board, and also undertakes the immediate supervision of the Air Department in his capacity of Director of Air Services. In that capacity he is responsible for the efficient performance of the duties of the Air Department, and as long as he remains with us he follows, of course, the financial and other rules laid down for the conduct of Admiralty business. Either in person or by a deputy, it is his business to arrange visits to the various air stations with a view to taking care that the

technical training of the personnel is being carried out as it should be, and that the station is efficiently organised and equipped for thoroughly efficient service. As Director of Air Services, he communicates direct with the Air Board, the Directorate of Military Aeronautics at the War Office, and the Ministry of Munitions. In those circumstances, in the person of the Fifth Sea Lord and Director of Air Services we have the most complete assurance that there will be all necessary co-operation and co-ordination between claims which otherwise might presumably be competitive. I need not, I think, go into the history of the airships. A good deal of it is, of course, past history. All possible progress is being made, and I think I may fairly say actively made, along the lines which I am quite sure he would wish. As regards the charge of hoarding material on the part of the Admiralty—hoarding engines, nuts, bolts, tools, steel, and so on—certainly that is not correct to-day, and I am emphatically assured that there is the most complete co-ordination, good will, and co-operation between the two arms of the Service. And so there ought to be. This is no time to be fighting battles on the Whitehall front. The front is in other directions, and there is full scope on the other fronts for all possible activity and energy. As regards the last proposition, as to handing over to the Air Board the whole question, not only of the supply of material and so forth, but of the personnel, I rather gathered from the comments that he (Capt. Burgoyne) had in mind at any rate a common training from the early stages and then ultimate specialisation—after the common training of the personnel given under the Air Board—specialisation either by joining the Royal Naval Air Service on the one hand, or the Royal Flying Corps on the other. He called our attention also to the future developments of war in the air and the place which it may possibly fill in relation to war on land and sea. That is an extremely enticing field even for a person with no very vivid imagination, and undoubtedly it is stimulated by the rapid and striking advances which the last two or three years, and even the last few months, has seen in the matter of aeronautics. I have no doubt that the possibilities of warfare in this third element are hardly yet realised. As I say, the theme is very enticing. But I say also that what we have to do to-day is to apply ourselves for all we are worth to the successful prosecution of this war.

To that end we need to get this Service into its right place. My friend would hand all training establishments to the Air Board. He had in mind, I think, the idea of having a common training in the early stages and specialising afterwards. But I think you could not possibly dissect that part of the training establishment of the Royal Naval Air Service, which might fairly be called elementary, even if there were no other reason, and hand that over. It could not be done. It would mean dislocation, and it would be putting the thing into the melting-pot; and I think he would agree with me that this is not the time to do that. I am not sure that his proposition of specialisation after a common entry and elementary training for the two arms, the Royal Flying Corps and the Naval Air Service, is in this case possible. I will not dogmatise. But for the immediate prosecution of the war, using this warfare in the new element to the utmost advantage and exercising all possible expedition in our development of it, I do not think we can entertain the proposition that the personnel should, either in its early stages or entirely, be handed over at the present time to the Air Board. Mr. Bonar Law, on May 17th last year, summed up the position in a very striking way, if I may say so, in four simple words. They were: "Speed up without interruption." That seems to be our duty at the present time, and therefore I do not think my hon. and gallant friend's proposal can be entertained. It does not help. It would mean dislocation and interruption, and it does not help the prosecution of the war at the present moment. For the rest, I was very interested to hear his many comments, and I can assure him that he may have the most complete confidence that there is thorough co-ordination and unity of purpose and aim between those responsible for the two arms of this Service at the present time.

### Street v. Zepp. Fatalities.

MR. MACVEAGH, on February 26th, asked the Home Secretary to state the total number of fatal accidents in the London streets between sunset and sunrise since the beginning of the war, and the total number of persons killed by Zeppelins in the same period.

Sir G. Cave said that the information desired was not available in that precise form, but the number of fatal accidents in the Metropolitan Police district during the hours of



darkness between August 1st, 1914, and January 31st last was 954; the number killed by Zeppelins in the same district was 137. The corresponding figures for the City were 29 fatal accidents, 13 persons killed by Zeppelins.

Mr. H. Law: Have we not come to the time when the whole policy of lighting may be reconsidered?

Sir G. Cave: The policy has just been reconsidered and alterations made.

## THE AERONAUTICAL SOCIETY OF GREAT BRITAIN.

### "The Less Satisfactory Materials of Aircraft Construction."

ON Wednesday evening, February 21st, the Aeronautical Society held its third meeting of the new session at the Royal Society of Arts, when Capt. G. S. Walpole, D.Sc., F.I.C., A.I.D., read a paper—or, perhaps, it would be more correct to say delivered a lecture on the "Less Satisfactory Materials of Aircraft Construction." Capt. Walpole accompanied his remarks with some interesting slides, and had on a table near by a selection of instructive examples of less satisfactory materials, which, unfortunately, were only visible to the naked eye at long range, except for a favoured few who managed to form a small A.I.D. of their own round the table after the lecture.

In his opening remarks, Capt. Walpole pointed out that materials other than metal were less satisfactory, because they were not so permanent against age, varying temperature and humidity conditions. Also, the best results cannot be obtained with the same directness and precision of forecast as with metals. He then proceeded to deal with the question of rubber, showing first of all some views illustrating the construction and testing of rubber-cord tyres. He showed how design can enter, not only into the shape, size, &c., but also into the composition and properties of the rubber. He also touched on other points in connection with shock absorbers, tubing for conveying petrol, oil, &c. In reference to the tubing, he showed a sample which was, he said, absolutely proof against the action of petrol.

The next material to be dealt with was glue. The author explained, with the help of some interesting microscopical slides, what actually happens when two pieces of wood are glued together. It was shown very clearly how the glue penetrated into the interstices of the wood, and formed, so to speak, glue "fibres" connecting the two pieces together. One interesting conclusion arrived at was that a double-lap or "sandwich" joint was no stronger than a single lap joint. He also showed that no test pieces measure the strength of the joint in pure shear.

Ordinary fibre was briefly dwelt upon by the lecturer, who pointed out that it has marked variations in its properties in connection with humidity in two directions at right angles to one another—with and against the grain. As an example he gave the case of a fibre bush in a magneto, which, when made with the grain across, had a greater tendency to swell.

On the question of fabric, varnish and dope, Capt. Walpole had a good deal to say, and the following is a summary of the more important points which came in for general consideration. The number of coats and the effect of each coat on the fabric; the effect of rapid evaporation of the solvent; various cellulose acetates having similar compositions but different viscosities when dissolved; that tautness is independent of the degree of stretching of the original fabric, although largely affected by its count, twist and closeness of weave; the effect of dope on cotton and linen fabrics, showing that linen gives much better results than cotton; instruments for measuring tautness (a tautometer was exhibited); the porosity of dope films to water vapour; external protection from moisture obtainable by applying waterproof varnishes (but such protection only lasting till cracking of the latter); the essential properties of such varnishes, adhesion, lightness, sufficient flexibility to follow variations in tautness and stress in flight without cracking; considerations affecting the stability of doped film; the proper application of the dope—air bubbles arising out of the latter.

### Fog Conditions.

A SPECIAL meeting was arranged by the Aeronautical Society, on Wednesday, at the Royal Automobile Club, when Major G. I. Taylor, R.F.C., of the Meteorological Office, lectured on "Fog Conditions," and outlined the causes of fogs as well as giving a method of forecasting their appearance. General W. S. Brancker was in the chair.

### The Aeronautical Society's Lectures.

DETAILS are now available regarding the remainder of the course of fortnightly lectures which have been arranged by the Aeronautical Society of Great Britain. The syllabus is as follows:—

March 7th.—"Methods of Measuring Aircraft Perform-

ances"; by Capt. H. J. Tizard, R.F.C. (R.F.C. Testing Squadron), Lord Sydenham, G.C.I.E., F.R.S., in the Chair.

March 21st.—"Commercial Aeronautics"; by Mr. Holt Thomas, Lord Cowdray, President Air Ministry, in the Chair.

April 4th.—"Magneto Ignition on Aircraft"; by Mr. A. B. Young, Col. Sir Capel Holden, K.C.B., F.R.S., in the Chair.

April 18th.—"Steel and Steel Alloys"; by Dr. W. H. Hatfield (Brown Firth Laboratory, Sheffield), Sir Charles Parsons, K.C.B., D.Sc., F.R.S., in the Chair.

May 2nd.—"Meteorological Dangers to Flying"; by Capt. C. P. Cave, R.F.C., Sir Walter Lawrence, K.C.I.E., in the Chair.

May 16th.—"Aero Engines"; by Mr. L. Coatalen, Mr. Dugald Clerk, F.R.S., in the Chair.

May 30th.—"Timber," name of lecturer to be announced later.

June 13th.—"A further Three Years' Flying Experience"; by Capt. B. C. Hucks, R.F.C.

June 27th.—"Aeronautical Engineers' Education"; by Dr. Mullineux Walmsley and Mr. C. E. Larard.

The meetings will all be held in the rooms of the Society of Arts, John Street, Adelphi, commencing at 8 p.m.

### Educational Lectures on Aeronautics.

Nor the least valuable of the work of the Aeronautical Society of Great Britain is the arranging of lectures in various parts of the country with a view to assisting students. One such series of ten lectures is to begin on Thursday, March 1st, in St. Peter's Hall, Cricklewood Lane, N.W., by the kindness of Mr. F. Handley Page. The lectures will begin at 7.30 p.m., and many of them will be illustrated by lantern slides and models.

The full syllabus is as follows:—

March 1st.—"History and Development of the Aeroplane," giving the historical milestones in the evolution of the aeroplane and an introduction to the first principles of flight, by Bertram G. Cooper, A.F.Ae.S., Major-Gen. R. M. Ruck, C.M.G., in the Chair.

March 8th.—"The Aerofoil and Fluid Flow round bodies, etc.," the behaviour of flat and cambered planes, lift, drag, and efficiency, by E. S. Relf, A.R.C.Sc., A.F.Ae.S. (of the National Physical Laboratory), Mr. F. Handley Page, A.F.Ae.S., in the Chair.

March 15th.—"The AircREW." Theory and practice of the propulsion of aircraft, by A. Fage, A.F.Ae.S. (of the National Physical Laboratory).

March 22nd.—"The Modern Aeroplane." Giving the types and their performances, and probable lines of development, by Capt. F. S. Barnwell, R.F.C., Capt. G. de Havilland in the Chair.

March 29th.—"Materials and Methods of Design and Construction of Aeroplanes," by R. O. Boswall, A.F.Ae.S.

April 5th.—"History and Development of Balloons and Airships," as in the case of the aeroplane, by Lieut.-Colonel Waterlow, Wing Commander, R.N.A.S., Mr. Holt Thomas in the Chair.

April 12th.—"Constructional Materials." Methods and uses of modern airships, kite balloons and free balloons, by Lieut.-Colonel Waterlow, Wing Commander, R.N.A.S., Mr. Griffith Brewer, A.F.Ae.S., in the Chair.

April 19th.—"Stability and Control." Giving illustrations of stable and unstable types, explaining methods of calculations, etc., and effect of evolutions in the air, by L. Bairstow, A.F.Ae.S. (of the National Physical Laboratory), Lieut.-Col. Mervyn O'Gorman, C.B., F.Ae.S., in the Chair.

April 26th.—"Aero Engines." Theory and practice (standard types illustrated), by Lieut. J. S. Irving, R.F.C., Mr. Hugh Burroughes in the Chair.

May 3rd.—"Meteorology and Navigation." Giving the meteorological conditions which affect aircraft and explaining the various instruments which are used to facilitate navigation.

Tickets admitting to the whole course may be obtained from F. Handley Page, Esq., 110, Cricklewood Lane, N.W., or from the Secretary, Aeronautical Society of Great Britain, 11, Adam Street, Adelphi, London, W.C.



## NEW YORK AERO SHOW.

At last New York has seen a real aeroplane show. Several attempts have been made in the past to hold such an exhibition but they have usually been more or less in the nature of side-shows. In the "Pan-American Aeronautic Exposition" which was held in the Grand Central Palace, New York, from February 8th to 15th, the American public has had an opportunity of seeing at close range, not only to what extent aeroplane design has developed but also how the American industry is preparing to meet the demand which

machine, in exactly the same condition as it was flown by Orville and Wilbur Wright, was suspended in the middle of the hall. The other exhibits included

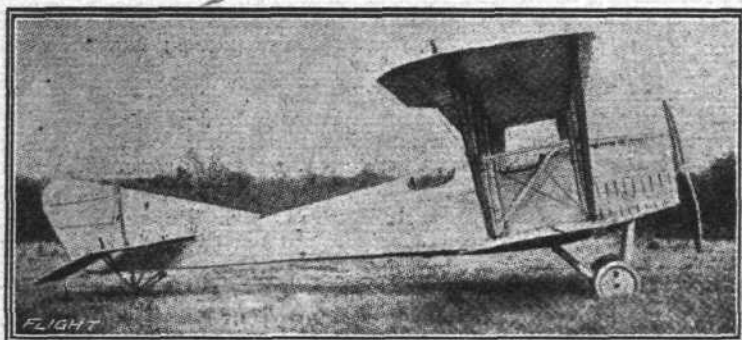
**Aeromarine Plane and Motor Co., New York.**—A two-seater training biplane, the features of which include a 100 h.p. motor, R.A.F. 6 wing section and a special chassis and shock absorbers. A high factor of safety is employed on these machines. This firm are also makers of aeromotors ranging from 6-cyl. 90 h.p. to 12-cyl. 200 h.p.



The Curtiss J.N. twin-engined biplane.

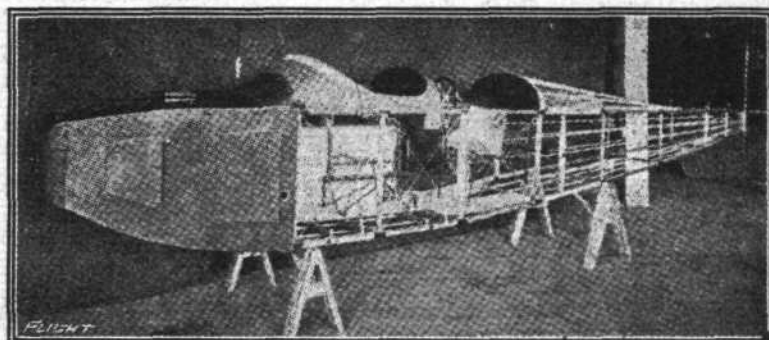
must inevitably come, although Congress dallies with the questions of naval and military aeronautics. At the present time it is not possible to publish a complete report of all the exhibits, but a summary is given below of the particulars given by the various exhibitors of what they proposed displaying on their stands. The accompanying photographs give an idea as to some of the machines and also motors which were staged. Both the heavier-than-air and the

**The B.F. Sturtevant Co.**—The new Sturtevant motor is of the 8-cyl. V-type, the bore being 4 ins. and the stroke  $5\frac{1}{2}$  ins. The cylinders are cast in pairs from an aluminium alloy and fitted with steel sleeves. Aluminium alloy is also used for the cylinder heads, which are separate, and also for the pistons. There are two sparking plugs, located in water-cooled bosses, in each cylinder, and two 8-cyl. magnetos are fitted.



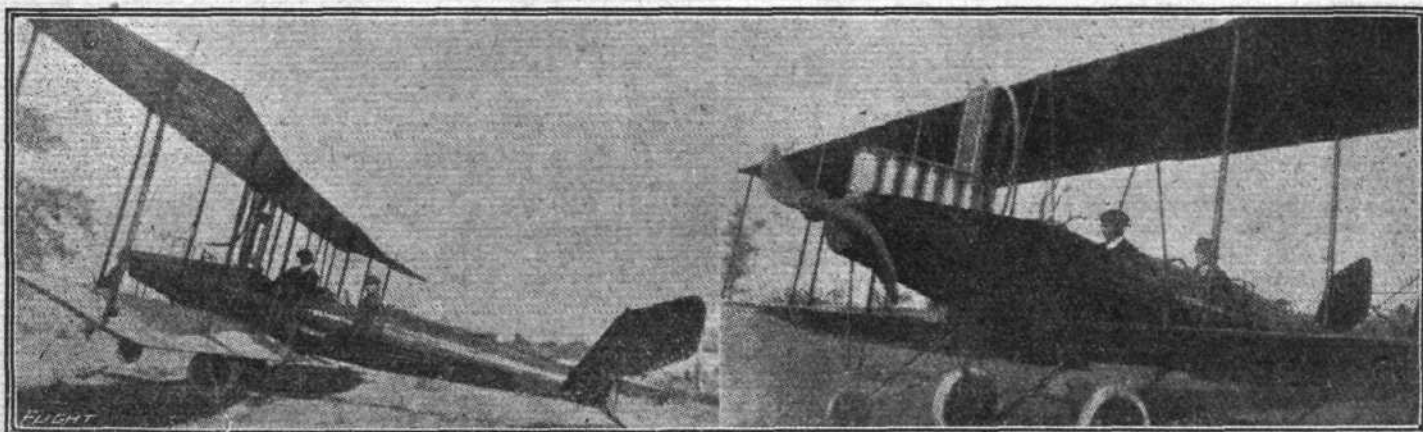
AT THE NEW YORK AERO SHOW.—The Thomas D.5 tractor.

lighter-than-air phases of aeronautics were represented, the latter including one of the small non-rigid airships built for the U.S. Navy and a kite balloon of the type supplied to the U.S. Army. The centre piece of the decorations of the Grand Central Palace was the original Wright flyer of 1903—the first power aeroplane to make a sustained flight. This



The Wright-Martin fuselage, showing method of construction.

**Burgess Co., Marblehead, Mass.**—A special reconnaissance seaplane of the Dunne type. It has a 140 h.p. engine, and the planes are swept back  $30^\circ$ . Pilot and passenger sit side by side in a well streamlined nacelle. The principal dimensions are: Span, 46 ft. 6 ins.; chord, 6 ft. 9 ins.; gap, 6 ft. 6 ins.; overall length, 31 ft.; stagger, 2 ft.



AT THE NEW YORK AERO SHOW.—Two views of the Benoist steel-clad tractor biplane,



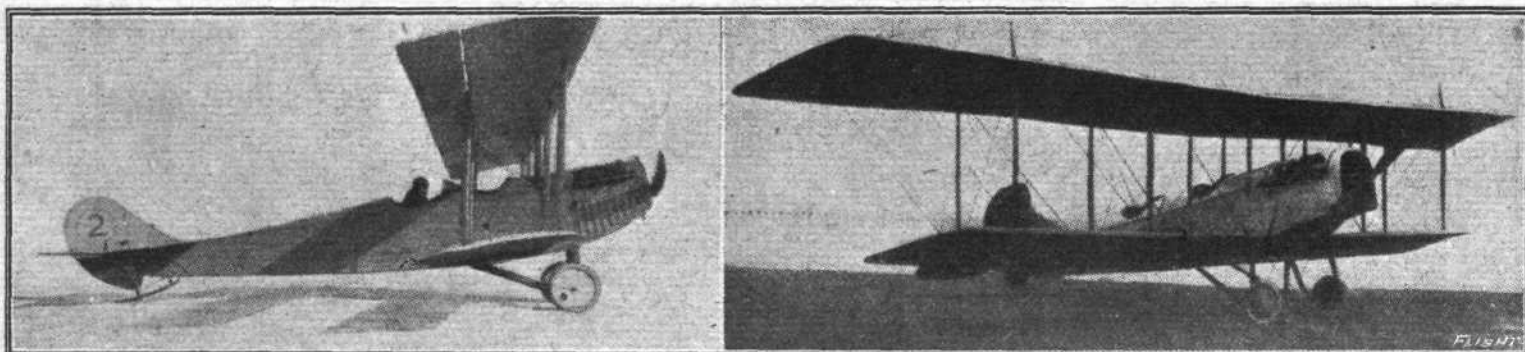
8 ins.; supporting surface, 650 sq. ft. It has a single pontoon float, and ailerons on both top and bottom planes steer the machine in all directions.

**Connecticut Aircraft Co., New Haven, Conn.**—The exhibits of this firm included a very large model of the non-rigid dirigible built for the U.S. Navy, a complete military kite-balloon and a 10 ft. model of a rigid airship.

**Curtiss Aeroplane and Motor Corp., Buffalo, N.Y.**—Various types of Curtiss aeroplanes; 90 h.p. J.N. 4-B. tractor, J.N. twin-engined tractor, N9 seaplane,

**L.W.F. Engineering Co.**—A two-seater reconnaissance tractor biplane, the principal feature of which consists of a laminated wood monocoque fuselage. This is built up of first a layer of wood running longitudinally, a layer of cloth, then another layer of wood set spirally, another layer of cloth, and a final layer of wood also set spirally, but in the reverse direction. The main planes are swept back and have a dihedral angle of  $1^{\circ}$ . The engine, which is totally enclosed, is a 140 h.p. Thomas.

**Packard Motor Car Co., Detroit.**—This company showed their new 200 h.p. 12-cyl. V-type aeroplane motor.



AT THE NEW YORK AERO SHOW.—On the left the Curtiss model J.N., and on the right the Curtiss R4.

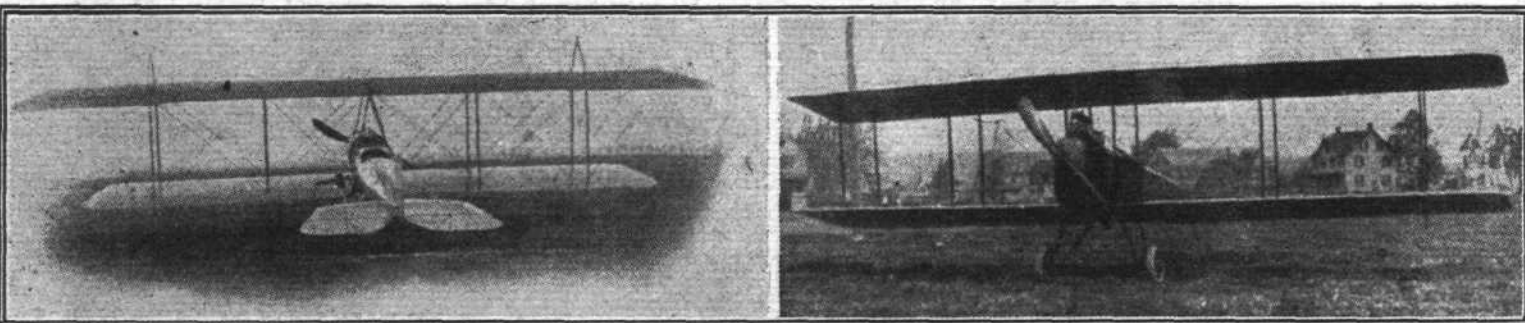
200 h.p. R4 tractor and 90 h.p. flying boat. The following are the specifications of each type:—J.N. 4-B: Span, 43 ft. 7½ ins. (top), 33 ft. 11½ ins. (bottom); chord, 4 ft. 11½ ins.; gap, 5 ft. 2½ ins.; stagger, 1 ft. 0½ ins.; overall length, 27 ft. 3 ins.; wing section, Eiffel 36 at  $2\frac{1}{2}^{\circ}$ ; dihedral angle,  $1^{\circ}$ ; supporting surface, 359.69 sq. ft.; gross weight, 1,905 lbs.; useful load, 585 lbs. J.N. twin: Span, 52 ft. 9½ ins. (top), 43 ft. 1½ ins. (bottom); chord, 4 ft. 11½ ins.; gap, 5 ft. 2½ ins.; stagger, 9½ ins.; dihedral angle,  $4\frac{1}{2}^{\circ}$ ; overall length, 29 ft. 10 ins.; wing section, Eiffel 36 at  $2^{\circ}$ ; supporting surface, 450.20 sq. ft.; gross weight, 3,150 lbs.; useful load, 1,040 lbs. N9 hydro: Span 53 ft. 3½ ins. (top), 43 ft. 0½ ins. (bottom); chord, 5 ft.; gap, 5 ft.; stagger, 9½ ins.; overall length, 29 ft. 10 ins.; wing section R.A.F. 6 at  $4^{\circ}$ ; supporting surface, 496.13 sq. ft.; gross weight, 2,410 lbs.; useful load, 510 lbs. R4: Span, 52 ft. 9½ ins. (top), 38 ft. 5½ ins. (bottom); chord, 6 ft. 3½ ins.; gap, 6 ft. 2½ ins.; stagger, 10½ ins.; dihedral angle,  $3^{\circ}$ ; overall length, 28 ft. 11½ ins.; wing section, R.A.F. 6 at  $2\frac{1}{2}^{\circ}$ ; supporting surface, 504.88 sq. ft.; gross weight, 3,245 lbs.; useful load, 1,020 lbs. Flying boat: Span, 45 ft. 2 ins. (top), 35 ft. (bottom); chord, 5 ft. 2 ins.; gap, 5 ft. 11 ins.; overall length, 28 ft.; wing section, Curtiss at  $6\frac{1}{2}^{\circ}$ ; supporting surface, 420 sq. ft.; gross weight, 2,100 lbs.; useful load, 660 lbs. Also 90, 100, and 200 h.p. aeromotors.

**S. S. Pierce Aeroplane Corp., Southampton, L.I.**—A small, light, sporting or school tractor biplane, having a span of 26 ft. for the top and 20 ft. for the bottom planes. It has a monocoque fuselage, and 40 h.p. 3-cyl. radial air-cooled engine (designed by Chas. L. Lawrence). The speed range obtained is 40-50 m.p.h.

**Standard Aero Corp., N.Y.**—Four types of machines are made by this firm, a tractor biplane (H-3), a twin-engined seaplane (D), a speed scout and a training machine (J), of which the first is probably being exhibited. H-3:—Span, 40 ft. 1 in.; chord, 6 ft. 6 ins.; gap, 6 ft. 6 ins.; stagger, 1 ft. 3 ins.; dihedral,  $3^{\circ}$ ; swept-back  $10^{\circ}$ ; overall length, 27 ft.; supporting surface, 491 sq. ft.; weight, 2,700 lbs.; useful load, 800 lbs.

**Thomas-Morse Aeroplane Corp., Ithaca, N.Y.**—The Thomas D-5 tractor biplane, as built for the U.S. Army and Navy, is a large reconnaissance machine, fitted with a Thomas model 8 135-h.p. motor with geared-down tractor screw. Dimensions:—Span, 52 ft. 6 ins. (top), 34 ft. (bottom); chord, 5 ft. 6 ins.; gap, 5 ft. 3 ins.; gross weight, 2,900 lbs.; useful load, 1,200 lbs.; speed range, 50-85 m.p.h.; climb, 3,000 ft. in 10 mins. In the latest models the overhang of the top plane has been slightly lessened, and the exhaust led over the top plane instead of along the side of the fuselage.

**Thomas Motor Co.**—Apart from their well-known 135



AT THE NEW YORK AERO SHOW.—On the left the L.W.F. tractor biplane, and on the right the Standard military tractor.

**The General Ordnance Co.**—A new 200 h.p. 8-cyl. engine is being introduced by this firm. The cylinders, which are 4½ ins. bore and 6½ ins. stroke, are set at an angle of  $90^{\circ}$ . The cylinders are cast in "Lynite," an aluminium alloy, with bronze liners pressed in, and the pistons are of Lynite.

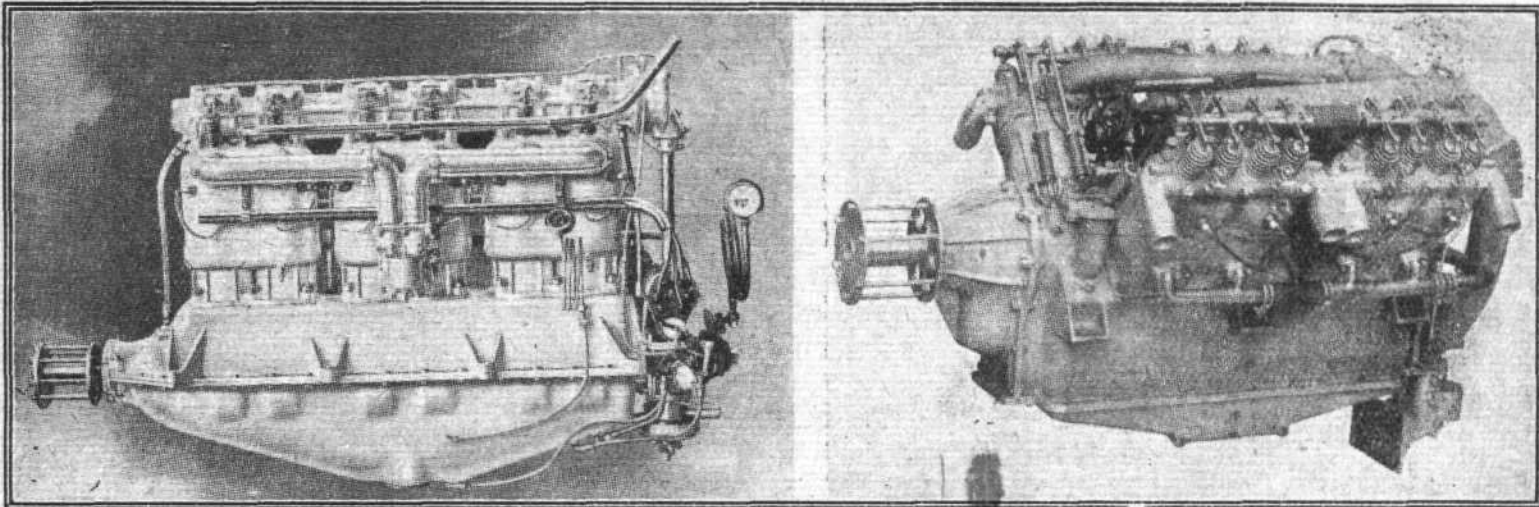
**General Vehicle Co., Long Island, N.Y.**—A 100 h.p. Monosoupape Gnome was exhibited by this firm, who are building the engine in America.

**Lawrence Lewis Aeroplane Co., Chicago, Ill.**—This is a new firm, constructing a novel type of tractor flying boat, the main feature of which consists in the absence of ailerons or other stabilising devices, and a kind of enclosed "fuselage" above the boat-hull.

h.p. motor, which has been fully described in these pages, the Thomas Motor Co. showed a new 8-cyl. V-type engine, with aluminium cylinders. The bore and stroke of this new motor is 4½ ins.  $\times$  5½ ins., and it is claimed to give 156 h.p. at 2,100 r.p.m.

**The Wisconsin Motor Manufacturing Co.**—In addition to their 140 h.p. 6-cyl. motor, this company exhibit their new 280 h.p. 12-cyl. V-type engine. As regards general design both engines are on similar lines, the cylinder dimensions in each case being 5 ins. bore by 6½ ins. stroke. The cylinders are cast of a special aluminium alloy and fitted with hardened steel sleeves ground to size; the valve seats and guides are of cast iron. The pistons are made of the same



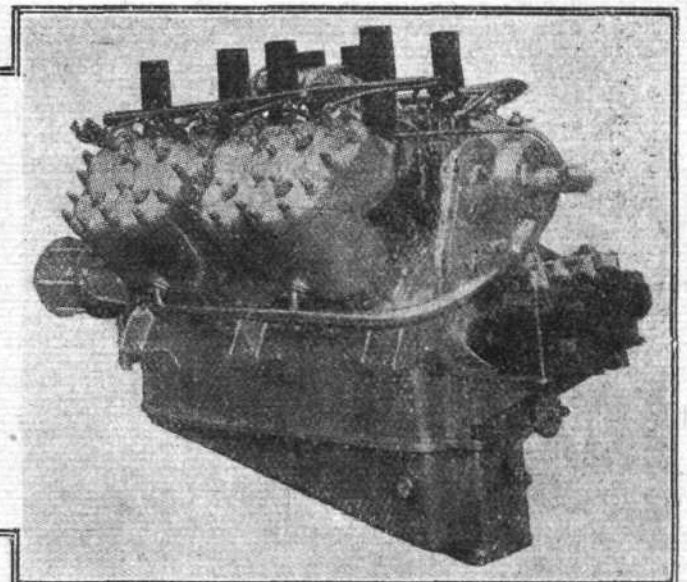
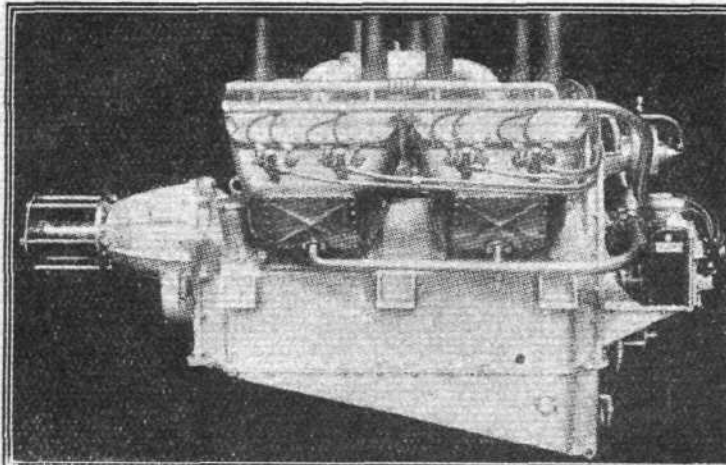


AT THE NEW YORK AERO SHOW.—On the left the 140 h.p. 6-cyl. Wisconsin motor, and on the right the Sturtevant aluminium engine.

aluminium alloy as the cylinders. Two magnetos are fitted to the 6-cyl. motor and four to the 12-cyl. motor, two sparking plugs being fitted to each cylinder.

The Wright-Marion Aircraft Corporation.—Each of

land tractor biplane equipped with a single six-cylinder Hall-Scott engine of 150 h.p., fitted with one propeller which we

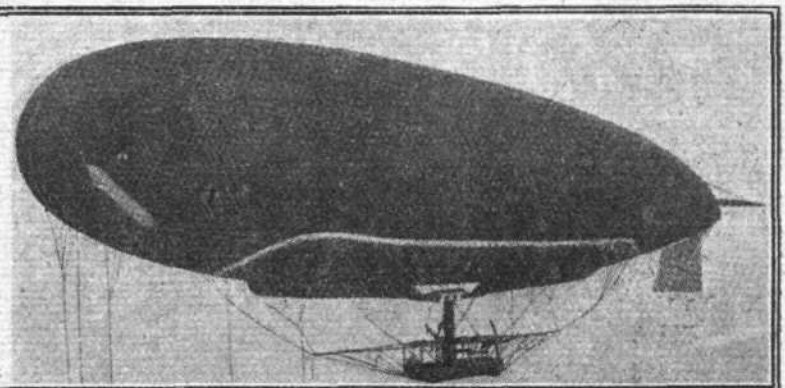
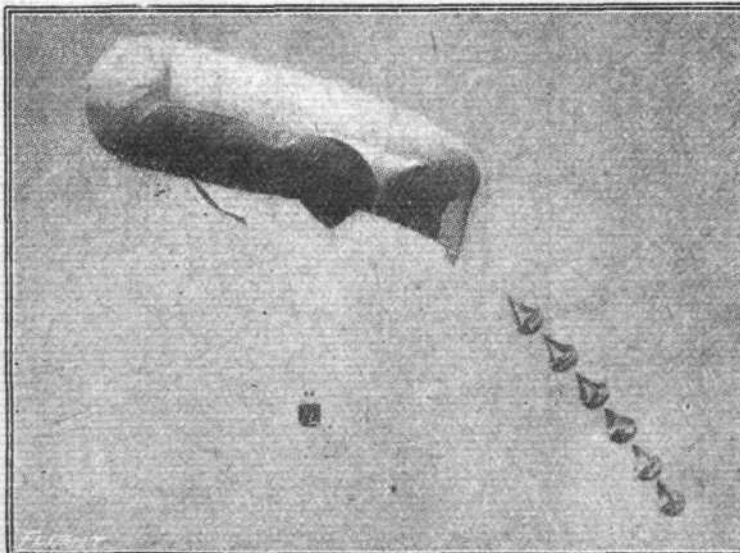


AT THE NEW YORK AERO SHOW.—On the left the 135 h.p. Thomas aeromotor, and on the right the new Thomas aluminium cylinder engine.

its subsidiary companies contributed a machine. The Los Angeles plant sent a model "R" two-place reconnaissance

deal with in a special article elsewhere. The Dayton factory sent a Model V tractor machine—an experimental biplane used for testing the Simplex Hispano-Suiza 8-cylinder engines. The Simplex motor plant at New Brunswick was represented by two aeroplane motors, the 150 h.p. 8 cyl. Simplex Model "A" Hispano-Suiza and the 75 h.p. 4-cyl. Model "B" Hispano-Suiza.

United Eastern Aeroplane Corp., Brooklyn, N.Y.—A tractor biplane, having swept-back planes.



On the left the Goodyear kite balloon, as supplied to the U.S. Army, and on the right a non-rigid dirigible built by the Connecticut Aircraft Co. for the U.S. Navy.



## THE AEROPLANE OF TO-MORROW.

By LOUIS DE BAZILLAC, Engineer (École Supérieure d'Aéronautique de Paris).

Translated by B. BRUCE-WALKER, B.Sc.

(Continued from page 190.)

### APPENDIX II.

The maximum of each of the climbing speeds  $N$  is attained or a value of  $S$  smaller than  $\left[\frac{a + \lambda}{w K_x} W_b\right]^{\frac{1}{2}}$  where  $\lambda$  is the detrimental resistance to forward motion;  $w$  the weight of a square metre of lifting surface; and  $W_b$  the weight of the machine without wings at sea level.

It has been proved above (articles of September, 1914) without giving the corresponding values of  $S$ , that the vertical climbing speeds  $N_{\alpha}$ ,  $N_0$ , and  $N_1$  expressed as functions of  $S$ , pass through a maximum.

It can be shown, to complete the calculation, that the maximum of each of the speeds  $N$  is attained for a value of  $S$  generally smaller than a certain well-defined magnitude:

$$S < \left[\frac{a + \lambda}{w K_x} W_b\right]^{\frac{1}{2}}$$

For this it is proposed to determine the maximum altitude attainable, as a function of the surface area, and the times necessary to climb to different altitudes.

Let  $Z$  be the altitude of the machine above sea-level,

$V$  its velocity at this instant,

and  $V_0$  its velocity at sea-level.

To simplify the calculations, we will impose the condition:

$$V = V_0 \gamma \quad (1)$$

$$\text{putting } \gamma = \sqrt{\frac{1}{\mu}} = \sqrt{\frac{760}{h}},$$

$h$  being the atmospheric pressure at the point considered.

We know also that

$$Z = 18,400 \times 2 \log \gamma;$$

$$\text{or again } Z = 2 A \log e \gamma;$$

$$\text{putting } A = 8,000$$

The relation,  $V = V_0 \gamma$  immediately gives the law of the variation of the speed as a function of the time, and of the direction of the tangent of the trajectory.

Lastly, the vertical speed is

$$\frac{dz}{dt} = V \sin \omega;$$

$\omega$  being the angle of the tangent to the trajectory with the horizontal.

$$Z = 2 A \log e \gamma = 2 A \log e \frac{V}{V_0}$$

$$\text{whence } dZ = 2 A \frac{dV}{V} = V \sin \omega$$

$$\text{and } \frac{dV}{df} = \frac{V^2}{2A} \sin \omega \quad (2)$$

Notice that the condition  $V = V_0 \gamma$  has the result of rendering the resistance of the air independent of the altitude. In fact, the lift and the drift are given respectively by:

$$F = R_y \frac{V^2}{\gamma^2} = R_y V_0^2$$

$$\text{and } R = R_x \frac{V^2}{\gamma^2} = R_x V_0^2.$$

This granted, the equations of the motion are obtained by the successive projection on the tangent and on the normal to the trajectory of the forces applied to the system:

$$H - R - W \sin \omega = m \frac{dV}{df}; \quad (3)$$

$$F - W \cos \omega = m V \frac{d\omega}{df}.$$

$H$  denoting the tractive force of the propeller;

$R$  the resistance of the aeroplane to forward motion

$$= R_x V_0^2;$$

$F$  the thrust normal to the trajectory  $= R_y V_0^2$ ;

$W$  the weight of the machine,  $m$  its mass  $= \frac{W}{g}$ ;

$V$  its velocity at the instant considered  $= V_0 \gamma$ ;

$\omega$  the angle of the tangent to the trajectory with the horizontal.

To these two equations it is necessary to attach the condition:

$$\frac{V^2}{2A} \sin \omega = \frac{dV}{df}.$$

Let us now write the equation of the tractive force of the propeller,  $H_0$ , at the level of the ground. This equation can be written with sufficient approximation:

$$H_0 = b - a V^2 \quad (4)$$

where the coefficient  $a$  is generally in the neighbourhood of 0.11.

Again, the tractive force  $H$  in an atmosphere at the pressure  $h$  is equal to:

$$H = H_0 \frac{h}{760},$$

$$\text{where } H = H_0 \frac{1}{\gamma^2} = H_0 \frac{V_0^2}{V^2} = b \frac{V_0^2}{V^2} - a V_0^2.$$

The equations of motion may then be written:

$$R_x V_0^2 = b \frac{V_0^2}{V^2} - a V_0^2 - W \sin \omega \left(1 + \frac{V^2}{2A g}\right);$$

$$R_y V_0^2 = W \cos \omega + m V \frac{d\omega}{df}; \quad (5)$$

$$\frac{dV}{df} = \frac{V^2}{2A} \sin \omega.$$

Having arrived at these results, we will suppose that during the climb the variations of the angle of attack and of the surface area are slight enough to allow the supposition that  $R_x$  remains constant.

This hypothesis, supported, moreover, by experience, for the variations of angle of attack permits the setting aside of the second equation of the motion, the first immediately giving the equation of the hodograph:

$$-(R_x + a) V_0^2 + b \frac{V_0^2}{V^2} = W \sin \omega \left(1 + \frac{V^2}{2A g}\right) \quad (6)$$

This equation being no longer a differential equation, it is permissible to neglect the term  $\frac{V^2}{2A g}$  as compared to unity

( $\frac{V^2}{2A g}$  is in the neighbourhood of 0.03).

We take, then, as the equation of the hodograph:—

$$\sin \omega = \left[ -(R_x + a) + \frac{b}{V^2} \right] \frac{V_0^2}{W} = \frac{1}{R_y} \left[ -(R_x + a) + \frac{b}{V^2} \right]. \quad (7)$$

$R_x$  and  $R_y$  corresponding to the limit of the angle of attack at the summit of the trajectory.

Equation (7), by introducing the variable  $\gamma = \frac{V}{V_0}$  and

putting  $\rho = \frac{R_x + a}{R_y}$ , can again be written:—

$$\sin \omega = \rho \left( \frac{\gamma_1^2}{\gamma^2} - 1 \right) \quad (8)$$

Where  $\gamma_1$  is the value of  $\gamma$  corresponding to the maximum altitude (summit of the trajectory).

The time necessary for climbing to a certain altitude will be given by equation (2).

$$t = 2 A \int_{V_0}^V \frac{dV}{V^2 \sin \omega} = \frac{2 A}{V_0} \int_{\gamma_1}^{\gamma} \frac{d\gamma}{\gamma^2 - \gamma_1^2}$$

$$t = \frac{A}{\rho V_0} \cdot \frac{1}{\gamma} \cdot \text{Log} e \frac{\gamma_1 + \gamma}{\gamma_1 - \gamma} \cdot \frac{\gamma_1 - 1}{\gamma_1 + 1}. \quad (9)$$

Suppose, that without altering the propulsive mechanism or the general design of the wings, the surface  $S$  is increased.

Let:

$w$  be the weight of a square metre of lifting surface;

$W_b$  the weight of the machine without wings;

$\lambda$  the detrimental resistance to forward motion.

When the machine has reached the summit of the trajectory it can be assumed that it satisfies the conditions of horizontal flight, or that then  $\frac{d\omega}{df} = 0$ .

Besides this  $\frac{dV}{df} = 0$  in the limit, since  $\frac{dV}{df} = \frac{V^2}{2A} \sin \omega$ .

We have, then, at the summit of the trajectory, by replacing  $V$  by  $V_0 \gamma$ , equation (3):—

$$R_x V_0^2 = \frac{b - a V_0^2 \gamma^2}{\gamma^2};$$

$$W = R_y V_0^2;$$

$$\frac{1}{\gamma^2} = \frac{W}{b} \cdot \frac{a + R_x}{R_y};$$

whence

$$\gamma^2 = \frac{b}{W_b + wS} \cdot \frac{K_y S}{K_x S + (a + \lambda)}$$

and an expression which increases with  $S$  so long as

$$S \leq \left[ \frac{a + \lambda}{w K_x} - W_b \right]^{\frac{1}{2}}.$$



In the expression (9) of the duration of the climb, the second factor of the product decreases when the maximum altitude increases. But the first term  $\frac{1}{\rho V_b}$ , which can be written:

$$\frac{R_y}{\sqrt{R_x + a}} = \frac{K_y}{\sqrt{\frac{K_x}{S} + \frac{a}{S^2}}}$$

increases with S. There will be then, generally speaking, a minimum of the duration of ascent for a value of S smaller than that which corresponds to the maximum of the altitude attained at the summit of the trajectory.

The results confirm by a more precise deduction those represented by Fig. 5 (articles of September, 1914), without taking account of the variation in weight. If the weight variation accruing from the increase of the surface is introduced, the curves of Fig. 5 must be modified.

It has been assumed that for S infinite  $\frac{H}{W} = t + 2ra_1$

In reality,  $\frac{H}{W} = \frac{H}{W_b + wS} = 0$  when S increases indefinitely.

The equations set forth above show, then, that

$$N_M = N_0 = 0 \text{ for } \frac{H}{W_b + wS} = t + 2ra_M,$$

$$\text{or for } S = \frac{1}{w} \left[ \frac{H}{t + 2ra_M} - W_b \right]$$

$$N_1 = 0 \text{ for } \frac{H}{W + wS} - \frac{\lambda}{KS a_1} = t + 2ra_1$$

$$\text{For } S = \infty, N_M = N_0 = N_1 = -\sqrt{\frac{w}{K a_1}} (t + 2ra_1)$$

and the curves of Fig. (5) become as shown below:

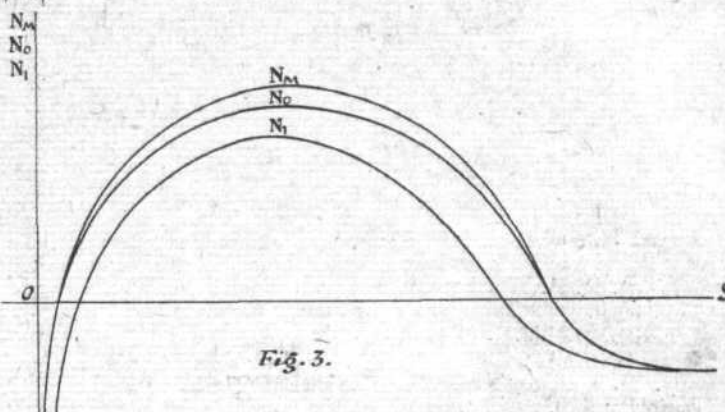


Fig. 3.

Replacing, in expression (9), the speed  $V_b$  by the speeds  $V_M, V_0, V_1$ , corresponding to the vertical speeds of ascent  $N_M, N_0, N_1$  at sea-level, we obtain the duration of ascent corresponding to these speeds, that is to say these speeds themselves.

The maximum of each of the curves of Fig. (3) is then generally attained for a value of S smaller than

$$\left[ \frac{a + \lambda}{w K_x} W_b \right]^{\frac{1}{2}},$$

S must consequently remain situated between the value it possesses for  $N_1 = 0$  and  $\left[ \frac{a + \lambda}{w K_x} W_b \right]^{\frac{1}{2}}.$

This limit will give, when the result found is compatible with constructional exigencies, the best wing surface for the aeroplane, for the given conditions.

## AIRCRAFT WORK AT THE FRONT.

### OFFICIAL INFORMATION.

#### British.

War Office, February 25th.

"Mesopotamia.—During the past few days two enemy aeroplanes have been shot down."

General Headquarters, February 26th.

"In the course of air fighting yesterday one German aeroplane was destroyed, and one other hostile machine driven down damaged."

War Office, February 26th.

"Mesopotamia.—Throughout the fighting (at Sanni-i-yat), our aeroplane squadrons have co-operated with invaluable results, freely using bombs and machine guns from minimum altitudes."

War Office, February 27th.

"Mesopotamia.—Later in the evening the Turks began to tow their bridge up stream from Bagilan, but the steamer slipped its tow on being bombed by our aeroplanes, and the pontoons floated down stream some distance."

#### French.

Paris, February 20th.

"A German aeroplane was brought down by our anti-aircraft guns south of Cernay."

Paris, February 22nd.

"Salonica.—Our aviators were everywhere very active, and fought several successful engagements. They dropped bombs successfully on enemy columns near Seres and on Melkuk."

Paris, February 25th.

"One of our squadrons effectively bombarded the railway stations at Grandpré and of Romagne-sous-Montfaucon."

Paris, February 26th.

"During yesterday our pilots brought down three German aeroplanes. One of these machines fell in our lines near Mersy (region of Rheims), the second south of Pinon (Aisne), and the third south-east of Altkirch. Our bombarding squadrons dropped numerous projectiles on bivouacs and a munition dépôt near Spincourt, where a number of explosions were heard, as well as on the aviation ground and hangars at Buzency, the railway at Ars-sur-Moselle, and the stations of Boussewiller and Woelfling (region of Wissembourg)."

#### Russian.

Petrograd, February 20th.

"In the region of Smorgon on Feb. 18th and 19th our pilots had a number of successful aerial engagements with the enemy. One of our aeroplanes, piloted by Sub-Lieut. Tamson, had a desperate combat with two enemy machines, and forced both to return to their position."

Petrograd, February 23rd.

"In the region of Shelvoff (24 miles west of Lutsik) a hostile machine attacked one of our aeroplanes, which was directed by Pilot Sub-Lieut. Svatogoroff. The latter turned his machine round with a sharp movement and fired upon his assailant at close quarters. The enemy machine planed and finally fell into the opposing lines north-west of Shelvoff."

Petrograd, February 25th.

"In the region south-east of Baranovichi an enemy aeroplane, which was subjected to our rifle and machine-gun fire, turned over several times in the air and fell into the enemy's lines."

Petrograd, February 27th.

"Our pilot, Sub-Lieutenant Efimoff, three times entered into combat with a German machine, which appeared over the town of Dvinsk. He compelled it to descend into the German lines."

#### Italian.

Rome, February 21st.

"Last night one of our airships successfully bombed some enemy billeting areas north-east of Comeno (Carso), causing the outbreak of big fires. In spite of heavy fire from hostile anti-aircraft batteries, she returned safely."

Rome, February 25th.

"The weather was favourable to aerial activity. Our aviators, supported by artillery, put to flight the hostile aeroplanes."

#### German.

Berlin, February 25th.

"During the night of the 23rd-24th a French airship was brought down in flames in the wood east of Saarlautern by our anti-aircraft fire. When it touched the ground the ammunition exploded. The crew, numbering fourteen, were killed."

Berlin, February 26th.

"Yesterday in numerous aerial engagements the enemy lost eight aeroplanes, two of which belonged to an air squadron, which dropped bombs unsuccessfully in the Saar region."

#### Austrian.

Vienna, February 20th.

"One of our airmen shot down a Russian aeroplane."

#### Bulgarian.

Sofia, February 21st.

"An enemy aeroplane unsuccessfully dropped bombs on the station of Oktchylar."

#### Turkish.

Constantinople, February 20th.

"On the Sinai front, on Feb. 5th (? 15th), an enemy aeroplane was compelled to land behind our positions. The enemy machine was burnt, but its pilot was made prisoner. There has been no event of importance on the other fronts."



# The British Air Services

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

## Royal Naval Air Service.

*Admiralty, February 20th.*

Lieut. R. B. Ward promoted to Lieut.-Com., with seniority Feb. 19th.

Lieut., R.N.V.R. (Temp.), J. M. Fraser promoted to Lieut.-Com. (Temp.), with seniority Feb. 17th.

J. N. Gallwey entered as Prob. Flight Officer (Temp.), seniority Feb. 25th, and appointed to "President," additional, for R.N.A.S.

*Admiralty, February 22nd.*

Temp. Prob. Flight Sub-Lieut. H. J. R. Maitland granted temp. commission as Sub-Lieut., R.N.V.R., seniority Feb. 21st.

V. H. Littleboy and Temp. Sub-Lieut. C. E. Bramhall, R.N.V.R., entered as Prob. Flight Officer, for temp. service, to date Jan. 1st and Feb. 21st respectively.

## Royal Flying Corps (Military Wing).

*London Gazette, February 20th.*

**Flight-Commanders.**—From Flying Officers, and to be Temp. Capt. whilst so empld.: Temp. 2nd Lieut. (Temp. Lieut.) H. T. Horsfield, Gen. List; Jan. 17th. 2nd Lieut. K. C. McCallum, Arg. and Suthd. Highrs., S.R.; Jan. 23rd. 2nd Lieut. (Temp. Lieut.) V. A. Stookes, M.C., Dns., S.R.; Feb. 2nd. Capt. E. J. D. Routh, K.R. Rif. C., S.R., from a Flying Officer; Feb. 4th. From Flying Officers and to be Temp. Capt. whilst so employed: 2nd Lieut. G. J. King, W. York. R. (T.F.); Feb. 5th. Temp. Lieut. R. H. Hood, Gen. List; Feb. 6th.

**Flying Officers.**—2nd Lieut. H. C. Brufton, Rif. Brig. (T.F.); Jan. 10th. Temp. Capt. C. O. F. Modin, Gen. List; Jan. 11th. Jan. 12th: 2nd Lieut. (Temp. Capt.) A. H. W. Fleming, Norf. R. (T.F.); Lieut. A. Clear, Manch. R. (T.F.); 2nd Lieut. R. E. Eversden, Yeo. (T.F.); 2nd Lieut. F. H. Dear, R. Suss. R. (T.F.). Temp. 2nd Lieut. A. C. Stopher, Gen. List, from a Flying Officer (Observer); Jan. 13th, but with seniority from Nov. 10th. 2nd Lieut. R. W. Reeve, Hereford R. (T.F.); Jan. 14th. Temp. Capt. W. B. Tisdall, A.S.C., and to be transfd. to Gen. List; Jan. 16th. Temp. Lieut. G. E. Hicks, Gen. List; Jan. 18th. 2nd Lieut. J. Mundie, Gord. Highrs. (T.F.); Jan. 21st. 2nd Lieut. K. C. Horner, W. York. R. (T.F.); Jan. 25th. Jan. 27th: Temp. Lieut. F. C. B. Douglas, Rif. Brig., and to be transfd. to Gen. List; Temp. 2nd Lieut. J. H. Cross, Gen. List. Jan. 28th: Lieut. G. R. Taylor, Bedf. R., S.R., and to be sec'd.; Temp. 2nd Lieut. G. A. D. Hancock, Gen. List. Jan. 29th: 2nd Lieut. P. Pike, Devon, R. (T.F.); 2nd Lieut. G. E. G. Round, Divl. Sig. Co. (R.E.), (T.F.); 2nd Lieut. A. S. Hett, S.R.; Temp. 2nd Lieut. E. L. Prichard-Evans, Gen. List; 2nd Lieut. (Temp. Lieut.) E. S. C. Brooks, Lond. R. (T.F.); Lieut. W. F. Lees, Canadian Engrs.; Temp. 2nd Lieut. S. N. Pike, attd. S. Lan. R., and to be transfd. to Gen. List; 2nd Lieut. V. L. A. Burns, R.F.A., (T.F.); Temp. 2nd Lieut. H. E. K. Eccles, Gen. List. Jan. 30th: Temp. Lieut. G. A. F. Leyton, Gen. List, from a Flying Officer (Observer), but with seniority from Nov. 22nd, 1915; 2nd Lieut. J. E. de Watteville, Camn. Highrs. (T.F.); Temp. 2nd Lieut. A. P. Matheson, A.S.C., and to be transfd. to Gen. List; Temp. Lieut. H. Blackman, Durh. L.I.; Temp. 2nd Lieut. G. Howe, Gen. List.

**Equipment Officers, 2nd Class.**—Feb. 1st: 2nd Lieut. (Temp. Lieut.) H. H. Thomas, R.F.A. (T.F.), from the 3rd Cl., and to retain his temp. rank whilst so employed. From the 3rd Cl., and to be Temp. Lieuts. whilst so employed: 2nd Lieut. A. J. Rickie, S.R.; Temp. 2nd Lieut. G. F. F. Collender, Gen. List; Temp. 2nd Lieut. W. J. Cooper, Gen. List; 2nd Lieut. G. E. Upton, S.R.; 2nd Lieut. R. J. Copley, S.R.

**Memoranda.**—The undermentioned to be Temp. Capt., Gen. List: Temp. Capt. Charles Oscar Frithiof Modin, from R. Mar., for duty with R.F.C.; Jan. 11th. The undermentioned to be Temp. Capt. (without the pay and allowances of that rank):—Feb. 21st: Temp. Lieut. S. B. Smith, Gen. List, a Flying Officer, R.F.C., whilst specially employed. Sub-Lieut. George Edward Hicks, from R.N.V.R., to be Temp. Lieut. on Gen. List for duty with R.F.C.; Jan. 18th. The undermentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: Sub-Lieut. J. E. Burgess, from

R.N.V.R.; Jan. 14th. C. W. Waitt; Jan. 22nd. W. A. Huntley; Jan. 25th.

**Supplementary to Regular Corps.**—The under-mentioned 2nd Lieuts. (on prob.) are confirmed in their rank: F. Cain, L. Crooks, A. S. Hett, E. W. Walford, F. A. Woolfe. The under-mentioned to be 2nd Lieuts. (on prob.); Feb. 3rd. R. R. Byrne, G. R. Cobb. T. D. Bucknill; Feb. 6th.

*London Gazette Supplement, February 21st.*

**Flight-Commanders.**—From Flying Officers, and to be Temp. Capt. whilst so employed: Lieut. the Hon. J. H. B. Rodney, Rif. Brig., S.R.; Nov. 1st. Jan. 1st: Lieut. G. H. Bowman, R. War. R., S.R.; Lieut. G. de L. Wooldridge, S.R.; Lieut. E. H. Pullinger, S.R.; 2nd Lieut. S. N. Cole, S.R. Jan. 14th: Temp. 2nd Lieut. (Temp. Lieut.) S. K. Muir, Gen. List; 2nd Lieut. J. Bell, S.R. Feb. 1st: Capt. (Temp. Maj.) R. H. Howell, Ind. Cav., from a Flying Officer. From Flying Officers, and to be Temp. Capt. whilst so employed: Temp. 2nd Lieut. E. R. Manning, Gen. List; Temp. 2nd Lieut. C. J. Truran, Gen. List; 2nd Lieut. W. L. Hay, S.R.; 2nd Lieut. J. O. Leach, M.C., Middx. R.; Temp. 2nd Lieut. J. Palethorpe, Gen. List.

**Flying Officers.**—2nd Lieut. J. E. Taylor, R.E. (T.F.); Jan. 13th. (Substituted for the notification in the Gazette of Feb. 1st.) Jan. 27th: Temp. 2nd Lieut. J. E. Addinsell, Gen. List; 2nd Lieut. C. R. Duggan, S.R.; 2nd Lieut. (on prob.) N. T. Croft, London R. (T.F.); Temp. 2nd Lieut. F. Roux, Gen. List. Jan. 28th: Temp. Capt. C. B. Tidmarsh, Wilts. R., and to be transfd. to Gen. List; 2nd Lieut. (Temp. Lieut.) E. R. Kerrison, Norf. R. (T.F.); 2nd Lieut. C. H. Beldam, Camb. R. (T.F.); 2nd Lieut. R. C. Hardie, D. of Corn. L.I., S.R., and to be sec'd.; Temp. 2nd Lieut. L. W. Beal, Gen. List; Temp. 2nd Lieut. J. J. Paine, Gen. List. Temp. Capt. H. G. Southon, Gen. List; Jan. 30th. Jan. 31st: Temp. Lieut. W. H. Legge, Gen. List; 2nd Lieut. E. W. Lindley, Manch. R. (T.F.); 2nd Lieut. V. Wigg, Lond. R. (T.F.); 2nd Lieut. (on prob.) N. D. Armstrong, Som. L.I., S.R., and to be sec'd.; Temp. 2nd Lieut. (on prob.) G. M. G. Bibby, Gen. List; Temp. 2nd Lieut. D. Townsend, Gen. List; 2nd Lieut. A. D. K. Perkins, R. Ir. Fus., and to be sec'd.; Lieut. (Temp. Capt.) C. T. Vachell, Mon. R. (T.F.); 2nd Lieut. R. M. H. Young, R. Scots (T.F.); Temp. 2nd Lieut. G. H. Haydock, High. L.I., and to be transfd. to Gen. List; 2nd Lieut. J. A. I. Watts, D. of Corn L.I., and to be sec'd.; Capt. C. T. Holmes, R. War. R., S.R., and to be sec'd.; Lieut. S. R. P. Walter, R.W. Surr. R., from Machine Gun Corps, and to remain sec'd.; 2nd Lieut. (Temp. Lieut.) T. E. Salt, R. War. R. (T.F.); 2nd Lieut. C. Turner, Worc. R., from a Flying Officer (Obs.), but with seniority from June 21st, 1916; Temp. 2nd Lieut. H. J. McCracken, attd. Ches. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) F. R. Maugham, Gen. List; Temp. 2nd Lieut. (on prob.) S. G. Knock, Gen. List; 2nd Lieut. E. R. Bottomley, R.F.A. (T.F.); Temp. 2nd Lieut. E. M. Roberts, Gen. List, from a Flying Officer (Obs.), but with seniority from Apr. 16th. Feb. 1st: Temp. Lieut. G. K. Smith, attd. York. R., and to be transfd. to Gen. List; Temp. 2nd Lieut. C. B. Dolphin, A.S.C., and to be transfd. to Gen. List; 2nd Lieut. G. I. Wilson, Yeo. (T.F.); Temp. 2nd Lieut. H. C. Duxbury, Gen. List; 2nd Lieut. J. A. Boret, R.W. Surr. R. (T.F.). Temp. 2nd Lieut. J. Harper, Gen. List; 2nd Feb. Temp. 2nd Lieut. H. P. Dean, S. Staff. R., and to be transfd. to Gen. List; Feb. 3rd. Feb. 4th: 2nd Lieut. C. E. W. Chapman, R.F.A. (T.F.); Temp. 2nd Lieut. (on prob.) H. Sanders, attd. N. Lan. R., and to be transfd. to Gen. List. Feb. 5th: Temp. 2nd Lieut. (on prob.) J. K. Ross, Gen. List; Temp. 2nd Lieut. (on prob.) E. D. Soar, Gen. List. Feb. 6th: 2nd Lieut. St. C. C. Tayler, R. Suss. R., and to be sec'd.; Temp. 2nd Lieut. J. W. Sheridan, attd. Camn. Highrs., and to be transfd. to Gen. List.

**Park-Commanders.**—And to be Temp. Majors whilst so employed. Feb. 1st: Lieut. (Temp. Capt.) C. P. Ogden, S.R., from an Equipment Officer, 1st Class; Lieut. (Temp. Capt.) C. Hirtzel, S.R., from a Staff Capt.; 2nd Lieut. (Temp. Capt.) R. S. Rumbold, Som. L.I., from an Equipment Officer, 1st Class.

**Equipment Officers (1st Class).**—From the 2nd Class, and to be Temp. Capt. whilst so employed. Feb. 1st: Lieut.



R. K. Pillers, Northn. R., S.R.; 2nd Lieut. (Temp. Lieut.) T. Bullen, Som. L.I.; 2nd Lieut. (Temp. Lieut.) E. G. A. Lefrere, S.R.

*2nd Class (from the 3rd Class).*—Temp. 2nd Lieut. E. R. Moxey, Gen. List, and to be Temp. Lieut. whilst so employed; Dec. 30th. Temp. Capt. R. F. Stapleton-Cotton, Gen. List; Jan. 1st. Lieut. J. E. Marriott, S.R.; Jan. 31st. Lieut. B. W. Watts, S.R.; Feb. 8th. From the 3rd Class, and to be Temp. Lieuts. whilst so employed: 2nd Lieut. L. J. Stuart, S.R.; Feb. 8th. Temp. 2nd Lieut. W. Scott, Gen. List; Feb. 13th.

*3rd Class.*—Temp. 2nd Lieut. M. F. W. Sampson, Gen. List; Dec. 3rd. Temp. 2nd Lieut. C. P. H. Gunyon, Gen. List; Dec. 4th. Feb. 5th: Temp. 2nd Lieut. (Temp. Capt.) B. T. Hood, Sco. Rif.; 2nd Lieut. (Temp. Lieut.) A. J. Elliott, R.F.C. (T.F.). 2nd Lieut. V. Stranders, R.F.A. (T.F.). Res.; Feb. 8th.

*London Gazette Supplement, Feb. 22nd.*

*Squadron-Commander.*—2nd Lieut. (Temp. Capt.) L. A. Tilney, Household Cav., from a Flight Com., and to be Temp. Maj. whilst so employed; Feb. 13th.

*Flying Officers.*—Jan. 29th: Lieut. W. P. Eastwood, Canadian Gen. List; 2nd Lieut. (on prob.) D. Gordon, Arg. and Suthd. Highrs. (T.F.). 2nd Lieut. (on prob.) L. A. Tapper, S.R.; Jan. 30th. Jan. 31st: 2nd Lieut. (on prob.) A. M. Lewis, R.G.A., S.R.; 2nd Lieut. E. Pownall, Lpool. R. (T.F.); 2nd Lieut. R. E. Kimbell, Hrs., and to be sec'd; 2nd Lieut. (on prob.) V. M. Bowling, S.R.; Lieut. A. B. Raymond, Can. A.S.C.; Temp. 2nd Lieut. A. W. Gardner, Gen. List. Feb. 1st: 2nd Lieut. C. T. Travers, Wilts R., and to be sec'd; 2nd Lieut. L. A. T. Strange, E. Kent R. (T.F.); Temp. 2nd Lieut. (on prob.) E. Mannock, R.E. 2nd Lieut. G. T. Brown, Welsh R. (T.F.); Feb. 2nd. Feb. 3rd: Temp. 2nd Lieut. A. P. Warren, Gen. List; 2nd Lieut. H. E. R. Twamley, Notts. and Derby R., and to be sec'd.

*Equipment Officers (2nd Class).*—From the 3rd Class. Feb. 1st: 2nd Lieut. (Temp. Capt.) P. L. Hunting, Northd. Fus. (T.F.); Lieut. F. A. Klipsch (T.F. Res.); Lieut. G. Somers-Clarke, S.R. From the 3rd Class, and to be Temp. Lieuts. whilst so employed; 2nd Lieut. R. N. Rowell, S.R.; 2nd Lieut. L. Stones, S.R.; 2nd Lieut. A. Young, S.R.; Temp. Lieut. H. Fernihough, Gen. List, from the 3rd Class. From the 3rd Class, and to be Temp. Lieuts. whilst so employed. 2nd Lieut. B. M. Iles, S.R.; Temp. 2nd Lieut. H. McKenna, Gen. List; 2nd Lieut. J. P. Angell, Gen. List. Lieut. W. W. Stenning, S.R., from the 3rd Class; Feb. 7th.

*3rd Class.*—2nd Lieut. (on prob.) E. C. Fowler, S.R.; Dec. 1st.

*Experimental Officers, 2nd Class (graded as Equipment Officers, 2nd Class).*—From the 3rd Class: 2nd Lieut. H. J. Poole, S.R., and to be Temp. Lieut. whilst so employed; Jan. 25th. Feb. 1st: 2nd Lieut. (Temp. Lieut.) J. R. H. Whiston, Notts. and Derby R. (T.F.); 2nd Lieut. E. W. Bowen, S.R., and to be Temp. Lieut. whilst so employed.

*Memoranda.*—The under-mentioned to be Temp. Lieuts. whilst serving with R.F.C. 1st Jan.: 2nd Lieut. (on prob.) J. G. Aronson, R. Lanc. R., S.R. Temp. 2nd Lieuts.—E. R. Wilkinson, J. Morris, F. M. Kitto, G. A. Hyde, M.C., W. Bruce, H. S. Wilcox. Sub-Lieut. W. H. Legge, from R.N.V.R. to be Temp. Lieut. on Gen. List, for duty with R.F.C.; Jan. 31st. J. F. Dick to be Temp. 2nd Lieut. (on prob.) for duty with R.F.C.; Feb. 16th.

*Supplementary to Regular Corps.*—2nd Lieut. (on prob.) G. O. Lightbourn resigns his commission; Feb. 23rd.

*London Gazette, Feb. 23rd.*

*Flight-Commanders.*—From Flying Officers, and to be Temp. Capt. whilst so employed: 2nd Lieut. (Temp. Lieut.) A. Jennings, R.A.; Jan. 29th. Feb. 1st: 2nd Lieut. (on prob.) (Temp. Lieut.) N. Brearley, M.C., Lpool. R., S.R.; Temp. 2nd Lieut. J. S. Barnes, Gen. List. Lieut. (Temp. Capt.) G. L. Hunting, Northd. Fus. (T.F.), from a Flying Officer. From Flying Officers, and to be Temp. Capt. whilst so employed: Lieut. W. T. F. Holland, Lrs.; Lieut. W. C. Mackey, Sco. Rif.; Lieut. H. Hewett, R. Berks. R.; Lieut. A. C. Maund, Canadian Local Forces; Lieut. C. H. Jenkins, R. Suss. R., S.R.; Temp. 2nd Lieut. (Temp. Lieut.) S. E. Parker, Gen. List; Temp. Lieut. O. Hughes, Gen. List; 2nd Lieut. (Temp. Lieut.) S. L. Pettit, R. Fus., S.R.; 2nd Lieut. F. Egerton, Lrs.; 2nd Lieut. T. S. Sharpe, Glouc. R., S.R.; 2nd Lieut. J. H. Kelly, S.R.; 2nd Lieut. A. C. Hatfield, S.R.; 2nd Lieut. R. D. Clinch, S.R.; 2nd Lieut. L. C. Angstrom, S.R. Temp. Capt. C. N. Lowe, Gen. List, from a Flying Officer; 11th Feb.

*Depôt-Commander.*—Capt. (Temp. Maj.) S. A. Hebden, S.R., from a Comdt., School of Instrn., and to be Temp. Lieut.-Col. whilst so employed; Jan. 18th.

*Commandant (graded as a Park Commander).*—Temp. Capt.

I. U. D. Truman, Gen. List, from a Chief Instr., and to be Temp. Maj. whilst so employed, vice Capt. (Temp. Lieut.-Col.) S. A. Hebden, S.R.; Feb. 1st.

*Equipment Officers, 2nd Class.*—From Flying Officers, and to be Temp. Lieuts. whilst so employed; 2nd Lieut. F. G. Hogarth, S.R.; Jan. 3rd. 2nd Lieut. J. V. Nash, S.R.; Feb. 1st.

*3rd Class.*—2nd Lieut. F. W. Elstob, S.R.; Dec. 2nd, 1916. 2nd Lieut. (on prob.) D. E. Barnett, S.R.; Dec. 22nd. 2nd Lieut. F. Cain, S.R.; Jan. 28th. 2nd Lieut. (on prob.) H. G. Day, S.R.; Jan. 31st. 2nd Lieut. (on prob.) M. M. Merriman, S.R.; Feb. 1st.

*School of Aerial Gunnery.*

*Commandant (graded as a Squadron-Commander).*—Capt. R. Bell-Irving, Canadian Inf., from a Wing Instr. in Gunnery, and to be Temp. Major whilst so employed; Feb. 6th.

*Scottish School of Fitters.*

*Chief Instructor (graded as an Equipment Officer, 2nd Class).*—2nd Lieut. H. E. Steinberg, S.R., from an Equipment Officer, 3rd Cl., and to be Temp. Lieut. whilst so employed, vice Temp. Capt. I. U. D. Truman, Gen. List; Feb. 1st.

*Memoranda.*—Sergt. A. S. Talbot, from Aust. I.F. to be Temp. 2nd Lieut. for duty with R.F.C.; Aug. 16th. The undermentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.:—L.-Corpl. R. N. Swann, from Aust. I.F.; Aug. 8th. Jan. 30th: W. H. Dowling, R. S. Eachus, L. R. Peirce; Feb. 9th.

*Supplementary to Regular Corps.*—The undermentioned 2nd Lieuts. (on prob.) are confirmed in their rank: L. A. Tapper, V. M. Bowling, E. N. L. White, W. N. Spragg. The undermentioned to be 2nd Lieuts. (on prob.): S. H. Roberts; Feb. 6th. Feb. 9th: G. Ashworth, H. J. Ashwell, E. E. Blackall, S. L. Collins, W. G. Cullen, J. O. Clover, H. J. Clark, W. E. Dewbery, W. P. Farrow, W. H. Griffith, W. Gardner, B. A. Hill, B. S. Higgs, R. Hely, B. B. Johnson, G. G. Kitson, A. C. F. Lewins, H. S. Lewin, H. J. Lewis, W. E. Lowe, A. McCulloch, D. H. Moore, A. H. Prior, A. H. Page, P. H. Paul, F. J. R. Perfitt, T. Sherman, R. Stanley-Smith, R. J. Saunders, H. J. Skingle, W. Towell, J. I. Thompson, D. Warnford-Davis, C. G. Walton, G. G. Wood. Feb. 12th: S. E. Brett, F. J. H. Palmer, D'Arcy L. A. Searle.

*Temporary Appointments at War Office.*

*Deputy Director (graded for Pay as an Assistant Director).*—Temp. Hon. Lieut. Col. J. D. Cormack, C.M.G., Gen. List, from an Asst. Dir., and to be Temp. Hon. Col. whilst so employed; Dec. 14th.

*Assistant Director.*—Capt. F. C. Jenkins, R.F.C., S.R., from a Dep. Asst. Dir. and to be Temp. Lieut.-Col. whilst so employed, vice Temp. Hon. Col. J. D. Cormack, C.M.G.; Dec. 14th.

*Deputy Assistant Directors (from Staff Captains).*—Dec. 14th: Capt. C. W. C. Wheatley, R.F.C., S.R.; Temp. Capt. C. M. Smith, M.C., Gen. List; Temp. Capt. R. H. Brand, Gen. List. Maj. O. A. Walker, A. Ord. Dept. an Ord. Officer, 3rd Cl., from Dec. 14th to Feb. 11th. 2nd Lieut. (Temp. Capt.) C. H. Whittington, R.F.C., S.R., from an Equipment Officer, 1st Cl., R.F.C., and to retain his temp. rank whilst so employed. Dec. 14th: Temp. Maj. T. E. St. C. Daniell, M.C., Gen. List, from a Park Comdr., R.F.C., vice Maj. O. A. Walker, A. Ord. Dept.; Feb. 12th.

*Deputy Assistant Directors (graded for pay as Staff Captains).*—Dec. 14th: Maj. J. G. Weir, R.F.A., T.F., from a Squadron Comdr., R.F.C.; Maj. I. B. Davson, Yeo., T.F., from a Staff Capt.; Temp. Capt. R. H. Austin-Sparks, Gen. List., from an Equipment Officer, 1st Cl., R.F.C. Temp. Maj. A. E. J. Reiss, attd. Ches. R. from a Staff Capt., and to be transfd. to Gen. List; Jan. 18th. Temp. Capt. K. G. S. Hatfield, Gen. List from a Staff Capt.; Feb. 17th.

*Staff Captains.*—Dec. 14th: Temp. Capt. T. B. Morley, Gen. List, from an Equipment Officer, 1st Cl., R.F.C.; 2nd Lieut. M. O. Darby, R.F.C., S.R., from a Staff Lieut. and to be Temp. Capt. whilst so employed; Capt. G. W. Williamson, M.C., Manch. R., S.R., from a Staff Lieut., vice Capt. C. W. C. Wheatley, R.F.C., S.R.; 2nd Lieut. T. G. Leith, R.F.C., S.R., from a Staff Lieut. and to be Temp. Capt. whilst so employed, vice Temp. Capt. R. H. Brand, Gen. List. Temp. Capt. T. P. Searight, A.S.C., and to be transfd. to Gen. List, vice Temp. Capt. L. Sadler, A.S.C.; Jan. 1st.

*Staff Lieutenants.*—Dec. 14th: Temp. Capt. H. J. Page, Lond. R. (T.F.); 2nd Lieut. W. Park, R.F.C., S.R., from an Equipment Officer, 3rd Cl., R.F.C.; 2nd Lieut. H. Lloyd, R.F.C., S.R., from an Equipment Officer, 3rd Cl., R.F.C.; Temp. 2nd Lieut. T. G. Baxenden, attd. R. Fus., and to be transfd. to Gen. List vice Capt. G. W. Williamson, M.C., Manch. R., S.R.; Temp. Capt. E. P. Leigh-Bennett, Lond. R. (T.F.) vice 2nd Lieut. (Temp. Capt.) T. G. Leith, R.F.C.,



S.R.; Lieut. A. P. Thurston, R.F.C., S.R., vice 2nd Lieut. R. W. B. Billingham, R.F.C., S.R.; 2nd Lieut. H. B. Neame, R.F.C., S.R., from an Equipment Officer, 3rd Cl., vice Temp. Capt. R. A. Coote, Gen. List.

**Squadron Commander.**—Temp. Capt. P. G. Ross-Hume, Gen. List from a Flight Comdr., and to be Temp. Maj. whilst so employed; Feb. 9th.

**Flight Commanders.**—From Flying Officers and to be Temp. Capt. whilst so employed: Temp. Lieut. R. J. Sanceau, Gen. List; Feb. 8th. Temp. 2nd Lieut. C. R. Cox, Gen. List; Feb. 9th. 2nd Lieut. J. F. Gordon, Gord. Highrs.; Feb. 14th. 2nd Lieut. J. L. Leith, Hamps. R. (T.F.); Feb. 17th.

**Flying Officers.**—Temp. 2nd Lieut. A. S. Talbot, Gen. List; Dec. 25th. Feb. 7th: Lieut. A. Forson, R. Sco. Fus., S.R. and to be sec'd.; 2nd Lieut. C. R. Dougall, Arg. and Suthd. Highrs. (T.F.); Temp. 2nd Lieut. H. Turner, Training Res. Bn. and to be transfd. to Gen. List; Feb. 8th. Feb. 9th: Temp. 2nd Lieut. B. McEntegart, Lan. Fus., and to be transfd. to Gen. List; Temp. 2nd Lieut. (on prob.) R. M. Burnand, Gen. List.

**Equipment Officers, 3rd Class.**—Temp. 2nd Lieut. H. E. Hotchin, Gen. List; Jan. 3rd. Jan. 25th: Temp. 2nd Lieut. A. E. S. Story, Gen. List, from a Flying Officer; 2nd Lieut. (on prob.) H. C. Perks, S.R.

**Memoranda.**—The undermentioned to be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.: Temp. 2nd Lieut. S. M. Pemberton; Dec. 28th. Corpl. C. Atkey, from R.E.; Feb. 8th.

**General List.**—Temp. 2nd Lieut. G. Douglas relinquishes his commission on account of ill-health, and is granted the hon. rank of 2nd. Lieut: Feb. 25th.

*London Gazette Supplement, February 26th.*

**Flying Officers.**—Feb. 4th: 2nd Lieut. (Temp. Lieut.) G. Maxwell, Yeo. (T.F.), and to be sec'd.; 2nd Lieut. J. W. Hogben, R. Scots (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) G. Hodgson, attd. Northd. Fus., and to be transfd. to Gen. List. Feb. 5th: Lieut. (Temp. Capt.) F. H. Mardall, Ind. Army, from a Flying Officer (Observer), with seniority from July 26th; Lieut. (Temp. Capt.) H. P. Sworder, R.W. Surr. R., and to be sec'd.; 2nd Lieut. (on prob.) T. J. Owen, S.R.; 2nd Lieut. (on prob.) A. H. Bates, S.R. Feb. 7th: 2nd Lieut. M. T. Wright, N. Lan. R. (T.F.), and to be sec'd.; Temp. Lieut. H. E. O. Ellis, M.C., R.E.; 2nd Lieut. H. J. Platt, Oxf. and Bucks. L.I. (T.F.), and to be sec'd.

**Balloon Officers.**—Temp. 2nd Lieut. J. H. O'Connell, R.W. Surr. R., and to be transfd. to Gen. List; Dec. 16th, but with seniority from Aug. 14th. Temp. 2nd Lieut. E. A. Cleaver, E. York. R., and to be transfd. to Gen. List; Jan. 2nd, but with seniority from Sept. 5th. Jan. 18th: 2nd Lieut. (Temp. Lieut.) J. R. Bedwell, R.G.A. (T.F.), but with seniority from Aug. 30th; 2nd Lieut. E. G. N. Grimble, Herts. R. (T.F.), but with seniority from June 11th; 2nd Lieut. F. G. Lake, Herts. R. (T.F.), but with seniority from June 22nd. Capt. R. L. S. Raffles, R.W. Fus., S.R., reverts from a Balloon Co. Comdr. (graded as a Flight Comdr.) to a Balloon Officer, Feb. 10th, but with seniority from Sept. 5th, 1915.

**Equipment Officers, 3rd Class.**—Temp. 2nd Lieut. A. E. Young, R.A., and to be transfd. to Gen. List; Jan. 4th. 2nd Lieut. (Temp. Lieut.) A. W. Cott, S.R., reverts from an Equipment Officer, 2nd Class, to the 3rd Class, and relinquishes his temp. rank; Feb. 8th.

**Supplementary to Regular Corps.**—2nd Lieut. J. Paradise resigns his commission Feb. 27th.

**Royal Flying Corps (Territorial Force).**

*London Gazette Supplement, February 26th.*

2nd Lieut. (Temp. Lieut.) S. J. Waters is seconded for duty with R.F.C.



UNDER the above heading will be published weekly particulars of a personal character relating to those who have fallen or have been wounded in the country's service, announcements of marriage and other items concerning members of the Flying Services and others well known in the world of aviation. We shall be pleased to receive for publication properly authenticated particulars suitable for this column.

## Casualties.

Major MAURICE ADAM BLACK, Dragoon Guards and R.F.C. (reported missing, believed killed), was born in August, 1876, and entered the Dragoon Guards from the Militia in December, 1899. He had his majority in September, 1914, and was a Flight Commander, R.F.C., in August last year. Major Black saw service in the Boer War (1900-2), and had the Queen's and the King's medals with five bars. He was one of the best polo players in his regiment, for which he took part in the inter-regimental tournaments, and he was handicapped at six points on the Hurlingham list.

Lieutenant BERNARD TARRANT COLLIER, Norfolk Regiment, attached R.F.C., previously reported missing, but now unofficially reported killed while flying over the enemy lines on September 26th, 1916, aged 22 years, was the eldest son of Mr. and Mrs. Charles Tarrant Collier, of Judges' Walk, Norwich. He was educated at St. Cyprian's, Eastbourne, Bradfield College, and University College, Oxford. He was in the O.T.C. at Bradfield and Oxford, and obtained a commission in the Norfolk Regiment in October, 1914. He joined the R.F.C. in November, 1915, and in the following May was sent to the front. Writing of him and his observer, his squadron-commander says:—"He and Lieutenant Scaife (who is officially reported "missing") used nearly always to work together, and a more gallant pair were to be found nowhere. They have played a magnificent part in the war, and their fine work has been the subject of much praise from all sides."

Second Lieutenant FRANCIS MICHAEL MYERS, M.C., Suffolk Regiment, attached R.F.C., killed in action, received his commission in February of last year. His award of the Military Cross was gazetted in November "for conspicuous gallantry in action. He carried out a daring raid with great

courage and skill. Previously he did some valuable patrol work."

Lieutenant THOMAS FREDERICK PRESTON, Yeomanry and R.F.C., who after being reported missing is now officially reported killed, was third son of the late Sir Henry Jacob Preston, Beeston Hall, and of Lady Preston, Barton Hall, Norwich. Born in 1889, he was educated at Charterhouse, and in 1907 entered the Norwich Union Fire Insurance Office. Four years later he went to Egypt, where he worked first in the National Bank of Egypt, and then in the financial department of the Egyptian Civil Service at Cairo. In 1913 he returned to England to take an appointment offered him by J. and J. Colman, Ltd. He had been only a few months at Carrow Works when the war broke out. He went with his regiment to Suvla Bay, Gallipoli, where after a few months he contracted enteric, and was invalided home. In 1916 he joined the Royal Flying Corps, and proceeded to the front. He was reported missing on January 24th, and later he was reported killed with his observer. Lieutenant Preston was devoted to sailing, and was a member of the Norfolk and Suffolk Yacht Club, and was for several years secretary of Barton regattas. He was also a keen Association football player, and captained the Wroxham team for some years after the death of his uncle, Mr. G. E. Preston.

Captain FRANK W. H. SIMPSON, R.G.A., attached R.F.C., the son of Professor and Mrs. W. J. Simpson, of 31, York Terrace, Regent's Park, was 25 years of age when killed on February 16th. Educated at Winton House, Winchester, and Cheltenham College, and the Royal Military Academy, Woolwich, he obtained his commission in the Royal Artillery in 1911. Before the war he had passed the Army examination in Russian. He was at Malta at the outbreak of the war and came with his battery to England, and later proceeded



to the front. Eighteen months ago he joined the R.F.C. as an observer, and was mentioned in despatches; later he became a pilot and ultimately the senior Flight Commander to the squadron. Endowed with an exceptional combination of talents, artistic and scientific, he was not only a brilliant young soldier, devoted to his profession and a good organiser, but he was a splendid draftsman and caricaturist, and possessed an inventive faculty. In 1912 he invented for the Admiralty an automatic watertight ventilator, suitable for the ventilation of warships in rough weather, and he had just made another invention with regard to which the General Commanding the Flying Corps had expressed his warm thanks for what he termed "this highly ingenious device."

Lieutenant A. ERIC TOWNSEND, Durham L.I. and R.F.C., second and only remaining son of Dr. and Mrs. Townsend of Normanby, was killed on February 15th, aged 21. He was educated at Haileybury, and on leaving school went to the Cargo Fleet Iron Company (Limited). He joined the East Riding Yeomanry shortly after the outbreak of war, and received a commission in the Durham L.I. in November, 1914. Six months later he was invalided out of the Service owing to acute attacks of rheumatism. During the following 12 months he was actively employed at Cargo Fleet Iron Works, and eventually applied for, and was again given, a commission in his old regiment. A month later he was transferred to the R.F.C., and left England for the front on January 17th last. Dr. and Mrs. Townsend's eldest son, Lieutenant F. E. S. Townsend, was killed in France in September, 1916.

Second Lieutenant FRANCIS CHISHOLM YOUNG, R.F.C., killed while flying at the front on February 14th, was the

eldest son of Professor W. H. Young, F.R.S., Professor in Higher Mathematical Analysis at the University of Liverpool, and of his wife Grace Chisholm Young, Ph.D. (Göttingen), of Lausanne, Switzerland. Born in 1897, he was educated first in Göttingen, where his mother, an Englishwoman and Cambridge Wrangler, who in 1895 had been the first woman ever allowed by the Prussian authorities to take a degree, was then residing. Subsequently, on the removal of the family to Geneva, he was a pupil at the Collège de Genève, where he had an exceptionally brilliant record, passing out as head boy when two years younger than the rest of his class. After matriculating at the University of Geneva, he migrated early in 1914 to the University of Lausanne in order to study mechanical engineering; but in the autumn of 1915 came to England to offer himself for the Army. He was sent back by the War Office to complete his University course at Lausanne, and in July, 1916, returned to England and obtained a commission in the R.F.C., being given his "wings" in October. For the last three months he had been actively engaged at the front.

#### Married and to be Married.

The engagement is announced of Captain W. D. M. BELL, M.C., R.F.C., youngest son of the late Mr. Robert Bell, of Clifton Hall, Mid-Lothian, to KATIE, only child of Sir ERNEST and Lady SOARES, of 36, Princes Gate, S.W.

The marriage of Lieutenant RALPH ERSKINE, R.F.C., and JANE LENNOX, only daughter of Mr. and Mrs. WILLIAM HIGGINS, Glenafton, Wimbledon, will take place at St. Columba's Church, Pont Street, on March 9th, at 2.30 p.m.

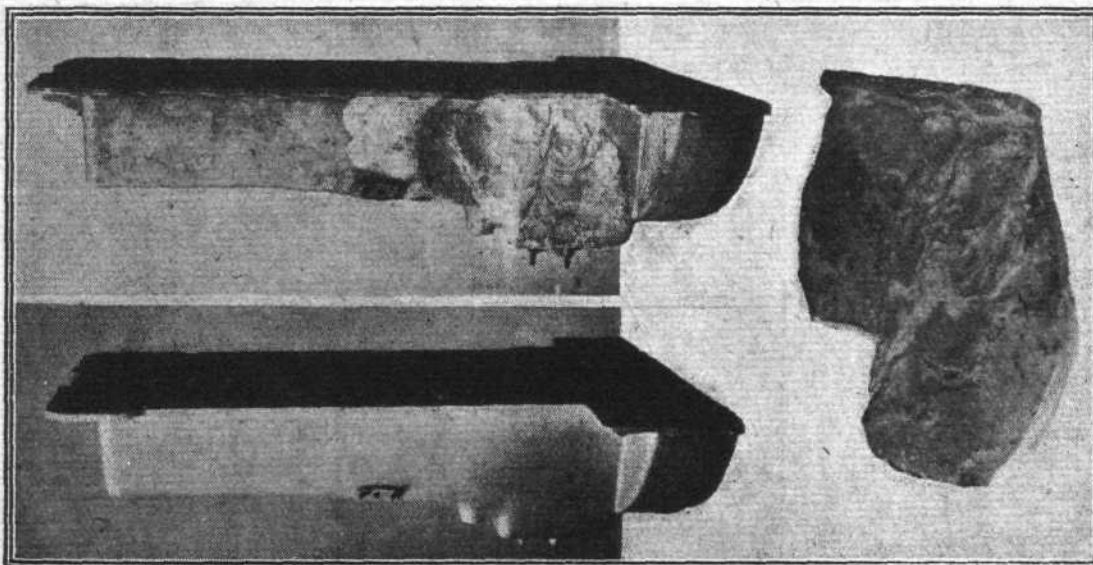
### SIDE-WINDS.

THE three photographs which are reproduced on this page tell a story the moral of which is: there are welders and—welders. The subject is the bottom half of a crank-case off a Packard 4-ton truck which had been unfortunate. Sent to a firm of "welders" to repair, it arrived home as in the top left-hand photo. Apart from the awful botch, the crank-case was so distorted as to be useless. As, however, the truck was in urgent demand for Government, it was decided to send the job along to Barimar's, Ltd., 10, Poland Street, W., to see what they could make of it.

THE first operation was somewhat of the surgical order, the excrescence seen in the right-hand photograph being cut

MR. EDWARD GENNA, well known in connection with the firm's various enterprises, has just resigned his position with the Sunbeam Motor Car Co., Ltd., of which he was the oldest employee, being the only man who was with it from its inception by Mr. Thomas Cureton, who was responsible for Alderman John Marston, J.P., establishing the enterprise over 18 years ago. Mr. Genna has severed his connection with the world-famous enterprise to undertake other war work.

MR. GENNA has seen the Sunbeam enterprise grow from a mere coach-house in Villiers Street, where the modern main offices and what is called the old factory of the firm stand to-day, to the gigantic enterprise which employs hands by the thousand, and which is producing aircraft engines of



A botch and a repair. —The top left hand photo. shows a crank-case as "repaired" by a firm of welders; below, the same crank-case after treatment by Barimar, Ltd. The latter included cutting away the excrescence seen on the right, casting a new piece, and welding it in place.

away. The crank-case was then straightened—it was 1½ out of square—and a new piece cast to fill up the gap. This was then fitted and welded into position, and after finishing up the crank-case was returned as seen in the bottom left-hand photo.—a recreated part, strong, durable and indistinguishable from new.

By way of expressing appreciation and grateful thanks for the highly sympathetic and liberal interest he had taken in the Overseas Dominions during his Mayoralty, Sir Charles Cheers Wakefield was last week presented at Australia House, Strand, by the Australian and Canadian Agents-General, with an illuminated address.

high output and of great variety to fulfil, between various types, almost every purpose of aerial warfare. In this connection it is interesting to note that Mr. Genna is able to refute the general notion that the Sunbeam firm has produced engines only during the last 10 years or so. The fact is that the very first car Sunbeam made in 1899 was built throughout by the firm and the parent enterprise of John Marston, Ltd., The very castings for the one cylinder, vertical engine were done by the latter, and even the sparking plugs were Sunbeam made.

MR. GENNA says he never remembers the year in which, from its start, the Sunbeam Company was not enlarging the scale of its enterprise.

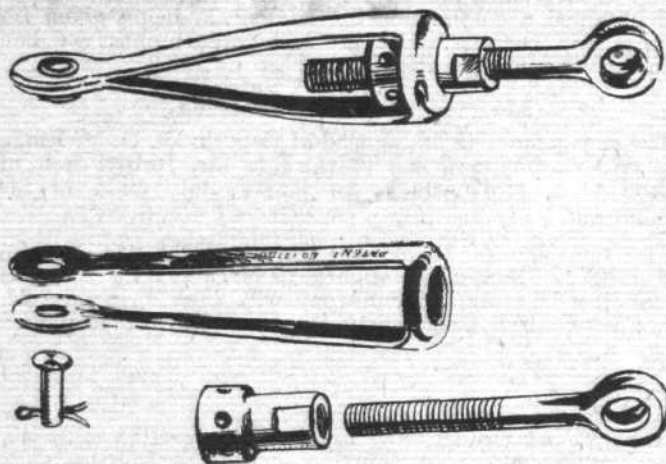


## THE "AVRO" PATENT BARRELLESS TURN- BUCKLES.

THIS turnbuckle, patented and produced by Messrs. A. V. Roe and Co., Ltd., and sold by the Aircraft Supplies Co., is at the present time being manufactured in two sizes.

It has already been approved by the Aeronautical Inspection Department for use for internal bracing in place of other strainers or turnbuckles, where the strength is not less than that required. As will be seen from the table, two strengths of turnbuckles are at present being made, Marks C and D, with a breaking load of 1,216 lbs., and Marks E and F, which fail at 1,950 lbs.

The supplies at the present time of Admiralty, A.G.S., and Binet types of turnbuckles are, as manufacturers know, not nearly equal to the demand, while considerable difficulty is being experienced at the present time particularly in regard

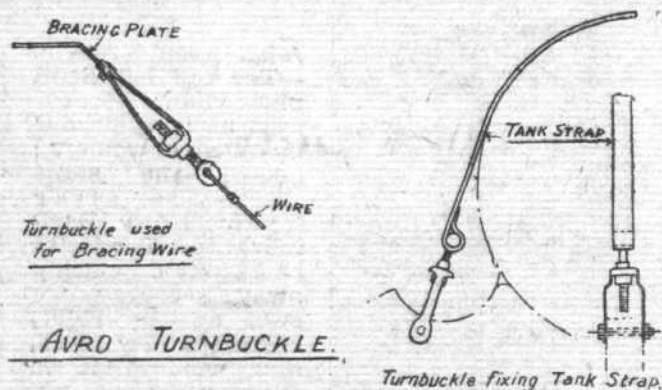


Above, one of the double-eye Avro turnbuckles complete, and below, one of the fork and eye turnbuckles disassembled.

to supplies of the R.A.F. turnbuckles, and more especially perhaps A.G.S. 140. It may be mentioned that the Avro Barrelless Turnbuckle comes out at one-third the price of the Admiralty and R.A.F. types, and is almost equivalent to the price of the Binet type strainers.

A number of novel and ingenious features are incorporated in the Avro Turnbuckle, the following being particularly worthy of note:

There is only one threaded shank and no internal threaded barrel. Hence this turnbuckle can be manufactured in approximately half the time of the standard type.



Two special applications of the Avro barrelless turnbuckle.

No Delta metal and no steel bar to R.A.F. specification 1 D. are employed in its construction, and since these materials are both very difficult to obtain at the present time, again the manufacture of this turnbuckle is facilitated, while the elimination of the materials mentioned enables considerable reduction in the cost.

All eye-end bodies are ferruled as shown, while those of the forked end type are supplied complete with pins and split pins, ready for direct attachment to the bracing lugs.

In operation this turnbuckle is extremely simple. Adjustment is effected by rotating the nut, which is provided with small flats to take an adjustable spanner or key. A special Avro key is supplied free of charge with every consignment of turnbuckles. Locking is effected by a locking wire being passed through two of the small holes in the nut and around one limb of the body stamping, with which the two free ends

are twisted together. If desired the wire may be led up through the eye of the bolt, but in practice this has not been found essential.

The Avro barrelless turnbuckle is the lightest turnbuckle extant, yet while fulfilling the ordinary functions is applicable to many special circumstances. By reason of the body being in the form of a stamping, it may be distorted in numerous ways to suit special purposes, and can be applied for the fixing of the tank strap to a box form body stiffener. In this case a special "T" bolt takes the place of the eye-bolt, while it should be noted that a special long shank bolt can be supplied to adapt these turnbuckles for the adjustment of control cables.

The Avro barrelless turnbuckle has been submitted to exhaustive tests, and while being approved for use on "Avro" machines is also approved by the A.I.D. for internal bracing and other uses, but for which, for the time being, they should be submitted to the A.I.D. in the usual way before being employed.

At the present time quantities of these turnbuckles are being supplied, and the manufacturers are, with the co-operation of other firms, using every endeavour to increase the output as much as possible.

Reference.	Equivalents.			Size.	Diameter of Pinhole.	Breaking Load.
	Admiralty type.	R.A.F. type.	Binet type.			
			m.m.		in.	lbs.
C.	A.G.S. 252	A.G.S. 140	4 x 44	4 m.m. B.C.E.	$\frac{5}{32}$	1,216
D.	A.G.S. 252	A.G.S. 140	4 x 44	4 m.m. A.B.C.	$\frac{5}{32}$	1,216
E.	Nil	A.G.S. 141 and 142	5 x 30	5 m.m. B.C.E.	$\frac{3}{16}$	1,950
F.	Nil	A.G.S. 141 and 142	5 x 30	5 m.m. A.B.C.	$\frac{3}{16}$	1,950

A.B.C. = fork and eye.

B.C.E. = double eye.

The prices of these turnbuckles may be obtained on application to the Aircraft Supplies Co., Ltd., 17, John Street, Theobalds Road, W.C., who have been appointed by Messrs. A. V. Roe and Co. as the sole selling agents.

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